Distinguishing Earth, Water, Fire, and Air: Factor Analysis to Determine the Four Fundamental Elements of State Capability

Distinguishing Earth, Water, Fire, and Air: Factor Analysis to Determine the Four Fundamental Elements of State Capability

Brian Drumm

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Abstract

While some states can send men to the moon and back, others cannot even muster the effectiveness to maintain order. Understanding what produces these differences in the capabilities of states to deliver outcomes to their citizens is central to understanding why these outcomes differ across states. But what are the fundamental elements of state capability? This has not yet been investigated; though previous attempts have been made to understand what the most popular state capability index actually measures, these were made to determine its validity, not its fundamental elements. I empirically determine that there are four fundamental elements of a states capability to deliver outcomes for its citizens by using a rigorous application of factor analysis to four state capability indexes: Outcomes delivered by a state are represented by the "Effectiveness" by which states are able to implement their "Political Gumption" (their responsiveness and political resourcefulness to satisfy the demands of their citizens) in the face of pressures, represented by the "Absence of Internal Pressures" and "Popular Support and Absence of External Pressures." These elements represent the differences in the capabilities of states to deliver outcomes for its citizens, and consequently at least partially represent the differences in outcomes across states.

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CHAPTER 1

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CHAPTER 2

Introduction

A central pursuit of development economics is to understand why outcomes differ across states. When it is the mandate of states to deliver outcomes for their citizens, understanding what produces differences in the capabilities of states to deliver these outcomes is paramount to this endeavor. There exist various notions of why the capabilities of states to deliver outcomes may differ. Indeed, it seems reasonable that the extent of corruption in the political system, the degree of impartiality of the legal system, the extent of ethnic tensions within a country, and the extent of political deadlock, to name a few, each impact the capability of a state to deliver outcomes for its citizens.

Accordingly, state capability indexes distinguish among and measure many such notions in order to quantify what appears to explain the differences in the capability of states to deliver outcomes. But are these notions truly the fundamental elements of state capability? Or are these notions simply manifestations of more fundamental forces at work?

Indeed, in order to formulate causal explanations for what determines the capability of a state, we must empirically resolve the number and identity of the elements of state capability.

This paper empirically determines the fundamental elements of a state's capability to deliver outcomes for its citizens. I apply factor analysis, which reveals the forces that drive the patterns of commonalities of a data set, to four state capability indexes to identify their fundamental elements. This analysis significantly expands previous attempts to investigate what is measured by state capability indexes. Indeed, only Thomas (2010), Langbein and Knack (2010) and Knoll and Zlocyzti (2011) have made such attempts to understand the Worldwide Governance Indicators (WGI), the most popular state capability index, but to determine its validity, not to determine its fundamental elements. Further, they improperly apply theory and factor analysis in order to investigate what is measured by the WGI. In contrast, I detail a rigorous application of factor analysis as a better procedure to determine what state capability indexes measure. I then apply this methodology to four state capability indexes - the Worldwide Governance Indicators, the International Country Risk Guide, the Bertelsmann's Stiftung's Transformation Index, and the Fragile State Index - that are representative of state capability indexes in general.

Factor analysis reveals there are four fundamental elements of a state's capability to deliver outcomes for its citizens. I name these four elements (1) "Effectiveness;" (2) "Political Gumption;" (3) "Absence of Internal Tensions;" and (4) "Popular Support and Absence of External Pressures." "Political Gumption" of a state represents the responsiveness and political resourcefulness that a government musters to satisfy the demands of its citizens. The outcomes that are actually delivered to its citizens are determined by the state's level of "Effectiveness" to implement its desires. Further, "Absence of Internal Tensions and "Popular Support and Absence of External Pressures" represent the

amount of pressure exerted on the state that disrupt its ability to implement its desired level of outcomes for its citizens. The indicators of the four studied state capability indexes are manifestations of these fundamental elements.

My analysis reveals the fundamental elements of a state's capability to deliver outcomes for its citizens. By distinguishing the truly fundamental elements of state capability, we can now begin the quest to determine what causally determines each of them to better understand why outcomes vary so drastically around the world.

CHAPTER 3

Background

3.1 The Use of State Capability Indicators

Indexes of state capability permit quantitative research concerning the quality of institutions. But if these indicators do not measure the concepts of governance that they purport to measure, then economists striving to understand the role of institutions on societal outcomes could be led widely astray by the meaningless distinctions in state capabilities advocated by available indices. This hazard bears heavily on those that endeavor to discover truths about specific institutional dynamics[1]. Only logical challenges to the validity of these indicators for

[1]The concern raised by Knoll and Zloczysti (2011) that indicators unable to distinguish among distinct aspects of governance are inappropriate for allocating aid along those aspects is more trivial (Knoll and Zloczysti 2011). Consider a fund that rewards developing countries that lower corruption. It is true that a "Control of Corruption" indicator that really can only measure "Quality of Governance" would allocate more aid to those with higher quality governance, not necessarily to those with what we think of as better control of corruption. But if the indicator truly cannot distinguish between our notion of "Quality of Governance" and our more specific notion of "Control of Corruption," then the fund would likely be roughly successful at allocating aid to those that perform along our (artificial?) notion of "Control of Corruption." In the same way, analysis of institutional dynamics using this misleading "Control of Corruption" indicator would be

institutional analysis can assuage this compelling concern.

3.2 Prior Challenges to the Ability of State Capability Indicators to Measure Distinct Aspects of Institutions

It is only the most widely used of these indexes, the World Governance Indicators, however, that has borne challenges to its methodology of evaluating state capability. [2] In a comprehensive survey, Kaufmann et al. (2007), the authors of the WGIs, detail and effectively respond to the full range of these critiques, including concerns that the WGIs are biased, or imprecise, or lack transparency, or are unable to compare governance across countries or over time, or rely upon improperly weighted or incorrectly modified source data that possibly exhibit correlated errors (Kaufmann et al. 2007).

But since the WGIs are meant to be proxies for particular aspects of institutional quality, these questions pale in importance to the fundamental evaluation of the relevance of the WGIs as proxies. This sentiment has produced three challenges to the appropriateness of the WGIs as proxies for what they purport to measure, constituting the only such challenges to state capability indicators in general[3].

useful to the extent that it reveals truths about our notion of "Quality of Governance," though it would be unable to reveal truths about our (artificial?) notion of "Control of Corruption."

[2]This is not to say that all other indexes of state capability were indisputably well-constructed and the WGI was not, but it is likely that scholars with limited time pursued methodological challenges to the most popular of these indexes in order to contribute critiques that had bearing on the most analyses possible.

[3]Since it is impossible to directly verify that an intangible notion is properly measured by an indicator that attempts to measure it (by the very definition of intangible), these scholars have rightfully resorted to logic arguments as alternative routes to evaluate these indicators.

3.2.1 Thomas' Qualms of Unverified Construct Validity

Concerned that the WGIs are unable to measure what they were constructed to measure, Thomas (2010) investigates their construct validity. A supposed measure of an unobservable phenomenon (or "construct") satisfies construct validity if it aligns with the construct itself. But since constructs are unobservable, it is impossible to directly compare indicators and their constructs. For this reason, construct validity analysis requires that a construct be rooted in a theory that explains how the construct is related to observables, which permits, via those observables, an indirect comparison of a construct to its purported indicator.

To prove construct validity, an indicator must be defined such that it matches the definition of the construct that it attempts to measure ("content validity"). Further, the indicator must be correlated with the variables that are predicted by theory to be correlated with the construct ("convergent validity"), and not be correlated with the variables that are predicted by theory to not be correlated with the construct ("divergent validity") (Thomas 2010). Since the authors of the WGIs do not provide a theory of how governance constructs are related to observables, Thomas argues that the construct validity of the WGIs cannot be verified. For this reason, Thomas rejects the validity of the WGIs as measures of what they claim to measure, contending that they have not yet been proven to actually measure their corresponding constructs (Thomas 2010).

The logic of construct validity collapses, however, upon consideration of its implication for data analysis, as Kaufmann et al. (2009) point out. Suppose that we assess the construct validity of indicators purporting to measure rule of law. Per construct validity analysis, we must first construct a theory about how this abstract notion of rule of law correlates to observables. In particular, our theory suggests that rule of law is positively correlated with

per capita GDP.[4] Only those indicators that also positively correlate with per capita GDP will satisfy convergent validity and be deemed "valid" indicators of rule of law since they demonstrate construct validity. Subsequent analysis of these "valid" indicators to understand the relationship between rule of law and per capita GDP however, will obviously verify the underlying theory used to choose the indicators, regardless of what may actually be the case![5]

Construct validity analysis identifies a vexing question: do indicators that are assembled to measure unobservable concepts actually measure those concepts? After all, those concepts are unobservable. Its approach, to draw upon theory to get a handle on an intangible and ensure that it correlates well with the indicators that attempt to measure it, is internally sound yet invalid for the bias that it imposes upon the indicators that it deems valid. Another avenue must be taken to scrutinize the measurement claim of state capability indicators.

3.2.2 Langbein and Knack's Faulty Tautology Argument

Langbein and Knack (2010) make one such attempt. The authors fear that past analysis of the WGIs have assumed with misplaced faith that the indicators truly measure distinct concepts of governance (Langbein and Knack 2010). After all, the authors note, it may very well be that the subjective assembly of the WGIs, expert as it may be, failed to construct distinct measures of governance (Langbein and Knack 2010). To investigate this concern, the authors constructed and tested three competing models relating the WGIs, a measurement model, a causal model, and a mixed model, to assess the WGIs claim that they constitute

[4]For simplicity, I am not indicating what rule of law should not be correlated with. This has no bearing on the validity of my argumentation.

[5]The above argumentation draws from the logic presented by Kaufmann et al. (2009).

distinct indicators of governance[6].

The authors implicitly argue that an underlying relationship, of any sort, governs a meaningful set of variables. Empirical exploration of a meaningful set of variables, then, should reveal that the variables exhibit a particular coherence with one relationship over others. But since they find that the WGIs are explained equally well by all three models, Langbein and Knack (2010) argue that the WGIs are incoherent and meaningless (Langbein and Knack 2010).

Even if we accept the presented (and dubious) premise that variables are void if they are unable to support one model over another model that holds alternative implications, the empirical methods of Langbein and Knack (2010) that assessed these models were poorly constructed. In a remarkably naive manner, Langbein and Knack (2010) rely exclusively on simple OLS regressions to verify the purported causal relationships between the WGIs of the causal model (Langbein and Knack 2010). By doing so, Langbein and Knack (2010) unwisely assume that the regressor of each OLS regression is exogenous to the dependent indicator, simply because the causal model so stipulates. But it is never logical to assume the assumption that you are testing. Indeed, their analysis does not rest upon any prevailing econometric method that assesses causality; their OLS regressions simply validate that there is indeed correlation between the WGIs. This is why Kaufmann et al. (2010) declare "KLs [Langbein and Knack (2010)] specification and estimation of their 'causal model' is breathtakingly naive" (Kaufmann et al. 2010).[7]

[6]The measurement model advances the hypothesis that the indicators represent the same notion of governance. All six WGIs, the model purports, stand as different names for the same fundamental concept of governance. The causal model claims that the WGIs instead represent discrete aspects of governance that causally determine each other. In particular, the model claims that five of the WGIs, in combination, directly impact the sixth (Langbein and Knack 2010). The mixed model proposes that two indicators directly impact the notion of governance, which is measured by the other four indicators (Langbein and Knack 2010).

[7]It is thus of no consequence to this point that the authors attempted to strength their OLS estimates

The measurement model presented by Langbein and Knack (2010), at least, was conducted more appropriately. The authors primarily relied upon a simple application of exploratory factor analysis, and verification by confirmatory factor analysis, to assess the claim that the WGIs instead measure the same concept of governance. After all, factor analysis reveals the latent factors underlying a set of variables. Since variables that are more closely related will likely be driven by a common latent factor, variables that share one latent factor are likely to be closely correlated. For this reason, the authors finding that the WGIs share one latent factor suggests evidence for not only the measurement model but also the notion that the WGIs are correlated.

As Kaufmann et al. (2010) assert, the steps Langbein and Knack (2010) took to "validate" their causal and measurement model, therefore, simply revealed the strong correlation among the WGIs that the authors of the WGIs already acknowledged was present (Kaufmann et al. 2010). With only this fact in hand, Langbein and Knack (2010) assert the incoherence of the WGIs, securing the incoherence of their own argument, not that of the WGIs. Indeed, since Langbein and Knack (2010) have utterly failed to validate competing models using the WGIs, they cannot possibly demonstrate their incoherence nor argue that the WGIs are not capable of measuring what they purport to measure. Yet another line of reasoning is needed to confirm the ability of the WGIs, and other indicators of state capability, as proxies fit for specific institutional analysis.

3.2.3 Previous Missue of Factor Analysis

Since the indicators of a particular index are constructed to measure related but distinct aspects of institutions, the number of these indicators should equal the number of related

with fixed effects and account for autocorrelation.

but distinct aspects of institutions that are actually measured by the index. Since properly conducted factor analysis reveals the latent factors that are measured by a data set, it can be used to assess the validity of state capability indicators to measure what they were constructed to measure. However, this potential has not yet been realized, for the two papers that have evaluated state capability indicators using factor analysis relied upon incorrect and insufficient methodology to produce contradictory results.

Knoll and Zloczysti (2011) performed factor analysis on seven indicators that the Millenium Challenge Account (MCA) uses to allocate aid to developing nations. The MCA groups 17 indicators from various sources into three dimensions of governance: Ruling Justly, Investing in People, and Economic Freedom. Of those indicators, Knoll and Zloczysti (2011) assert that seven are governance indicators, six measuring "Ruling Justly" and one measuring "Economic Freedom" (Knoll and Zloczysti 2011). Five of these are WGI indicators, including the WGI "Voice and Accountability" indicator (WGI VA), and the remaining two are Freedom House Indicators that are used to construct the WGI VA (Knoll and Zloczysti 2011). Knoll and Zloczysti (2011) determined that two latent factors are represented by these seven indicators, and that one latent factor is only measured by the two Freedom House indicators and the WGI VA (Knoll and Zloczysti 2011).

But results of factor analysis on multiple fundamentally redundant variables can be very misleading. Factor analysis attempts to expose the latent factors that are measured by indicators of a data set[8]. Implicit in this analysis is that commonalities among indicators reveal common latent factors that drive those indicators to move together. The stronger the commonality between a group of indicators, the more likely something is responsible for driving that commonality, and factor analysis assumes that those responsible are latent

[8]A more thorough understanding of factor analysis is laid out in the Methodology.

factors. But latent factors are not always what make indicators so similar. Consider five indicators that loosely measure the same aspect of governance. Factor analysis of these indicators would correctly reveal that one aspect of governance is measured. Now consider an additional two indicators, both of which were used to construct one of the previous five indicators[9]. Since one indicator is constructed as a combination of the others, it is possible that these three indicators share a stronger correlation amongst themselves than with the other four indicators. Noticing this tighter correlation, factor analysis would correctly suggest that there is something driving these indicators to move together within the broader common movement of all of the indicators, but would incorrectly suggest that this something is an additional latent factor. This possibility renders the results of Knoll and Zloczysti (2011), which analyzes the WGI VA and the two Freedom House indicators that construct it, invalid[10].

There are other problems with the analysis of Knoll and Zloczysti (2011). Knoll and Zloczysti (2011) posit two criteria for determining the number of latent factors revealed by factor analysis; the Kaiser criterion and the Jolliffe criterion (Knoll and Zloczysti 2011). The amount of variation a latent factor is able to explain is represented by the size of its

[9]This draws a distinction between indicators that noisly attempt to measure the same latent factor and indicators that are fundamentally redundant because of the way that they are constructed. Factor analysis on the former is helpful to reveal latent factors, factor analysis on the latter is misleading.

[10]Though indicators of a particular index are constructed to measure related but distinct concepts, indicators of multiple indexes make no such claim. Indeed, two indicators, both from different indexes, may attempt to measure the same aspect of governance. A factor analysis of these two indicators would reveal (correctly) that they collectively measure one latent factor, but an interpreter uninformed of their similarities would suggest that the two "distinct" variables are invalid measures of what they attempt to measure since they are unable to measure two distinct latent factors. Further, the notion of "governance" is quite subjective, and a particular state capability index relies upon a particular definition of governance to identify what it claims to be the complete set of related yet distinct aspects of governance. In this way, two indexes measuring "governance" may misleadingly be attempting to measure two fundamentally different notions. Consider two indexes that only are able to measure two latent factors apiece, but are based on definitions of governance so distinct that the four total latent factors are themselves distinct. Factor analysis of these indexes would suggest that governance indicators are able to measure four distinct aspects of governance, when in reality they each can only measure two but are attempting to measure fundamentally different concepts.

corresponding eigenvalue[11]. Kaiser (1974) suggests retaining factors with eigenvalues greater than 1, and Jolliffe (2002) suggests retaining factors with eigenvalues greater than 0.7 (Knoll and Zloczysti 2011). In their factor analysis of the seven indicators for all measured countries, they find that the first latent factor has eigenvalue of 5.664, the second latent factor has eigenvalue of 0.796, and third latent fator has eigenvalue of 0.034 (Knoll and Zloczysti 2011). Thus, the Kaiser criterion determines that the indicators only measure one latent factor while the Jolliffe criterion determines that the indicators are able to measure two latent factors. But inexplicably, the authors claim, "As both criteria yield the same result, a one – factor model is considered appropriate in the all – country sample. This finding is in line with previous studies, e.g. Langbein and Knack (2010)" (Knoll and Zloczysti 2011). This is simply false, and their unwillingness to admit a potential departure from earlier findings is baffling. Equally inexplicable is their inability to further explore the number of measured latent factors using the other, more robust, methods available in the face of contradictory results[12][13].

The methodology of Langbein and Knack (2010) isn't much more compelling. Langbein and Knack (2010) perform factor analysis on the six WGIs, but only use the Kaiser criterion to determine that the WGIs are only able to measure one latent factor. Relying upon only one method to determine the number of latent factors is misguided, however, for the results of each method are generally by themselves unreliable but when interpreted in concert are readily understood (Matsunaga 2010). In light of the contradictory (albeit invalid) finding by Knoll and Zloczysti (2011) that indicators of the WGIs within a set of

[11]See Methodology section for more information on factor analysis.

[12]See Methodology for a discussion of these methods.

[13]The authors also falsely claim that the seven indicators they analyzed were used by the MCA to measure seven distinct aspects of governance (Knoll and Zloczysti 2011). Rather, the MCA used those seven indicators as measures of two aspects of governance, "Ruling Justly" and "Economic Freedom." Their (albeit invalid) finding that these indicators measure two latent factors thus in no way invalidates the MCA's classification of indicators used for aid allocation, as Knoll and Zloczysti (2011) imply.

indicators are able to measure two dimensions, Langbein and Knack (2010)'s insufficient methodology is far from convincing and requires robust validation.

The apparent satisfaction of Knoll and Zloczysti (2011) and Langbein and Knack (2010) with insufficent exploration of the true number of latent factors measured by state capability indicators exposes a dangerous yet pervasive misconception that these indicators have already been proven to be invalid measures of distinct institutional aspects. Knoll and Zloczysti (2011) directly use the findings and reasoning of Langbein and Knack (2010) to confirm their discovery of one latent factor measured by indicators of the all country sample, and share the fear of Thomas (2010) that, "potentially weak construct validity would present a serious defect and a reason for questioning the use of perception-based governance indicators in aid allocation decisions." (Knoll and Zloczysti 2011).

Convinced of the validity of Langbein and Knack (2010) and Thomas (2010)'s challenge to the WGIs, Knoll and Zloczysti (2011) are then easily convinced, without further analysis of their own, that a conclusion that matches that of these authors is also valid. The same belief in their own conclusion appeared to have kept Langbein and Knack (2010) from performing additional tests that may have revealed an interesting and unforeseeable structure underlying the data set. Indeed, nearly every discussion of these indicators blindly accepts that state capability indicators have already been validly repudiated by Thomas (2010) or Langbein and Knack (2010), even though a careful analysis of their arguments as above firmly rejects such claims. These scholars' misplaced complacency dampens their yearning to surmount the naive answers suggested by superficial implementation of factor analysis, belittling this promising avenue of research to a simple validation of failed logic.

3.3 A Valid and Robust Approach to Assess State Capability Indicators

The claim that the WGIs, and other indicators of state capability, measure distinct components of governance has thus so far remained unchallenged by any robust and valid argument. It is the attempt of this paper to produce such a challenge.

CHAPTER 4

Data

Due to their careful and comprehensive construction, the Worldwide Governance Indicators (WGI) is the most commonly used and cited governance index (Arndt and Oman 2006); It stands on ecletic information; the WGI uses 31 survey sources to synthesize the perceptions of households, firms, experts, and private information providers (Kaufmann et al. 2011). Constituting "one of the most important governance indicators," the International Country Risk Guide (ICRG) is also very widely used for its impressive span across countries and through time; the institutions of 140 countries have been assessed monthly by experts since 1984 (Arndt and Oman 2006). Though the Bertelsmann Stiftung's Transformation Index (BTI), on the other extreme, was only established in 2003 as a biannual index, it is constructed using an extremely thorough procedure that compiles, verifies, and standardizes expert analysis, quantitative data, and self–collected data[1] (Bertlesmann Stiftung 2014a).

[1]The BTI claims that it is, "the first cross–national comparative index that uses self–collected data to comprehensively measure the quality of governance during processes of transistion" (Bertlesmann Stiftung 2014a)

The Fragile State Index (FSI), on the other hand, details state capabilities from a different perspective by measuring the risks faced by countries. The FSI also uses a significantly unique assessment procedure; the FSI synthesizes information from millions of articles to identify risks (The Fund for Peace 2014c).

These prominent state capability indexes vary widely across time, content, and construction. Assessment of these indexes thus permits a broad understanding of the abilities and limitations of state capability indexes that has been unattainable by all prior critiques of the validity of these indexes, which have just examined the WGI.

4.1 The Worldwide Governance Indicators

The Worldwide Governance Indicators, the most widely used state capability index and produced by Daniel Kaufmann, Aart Kraay, and Massimo Mastruzzi, detail the state of governance of 215 economies annually since 1996 (Helliwell 2014). In particular, the WGI is an attempt to evaluate the six distinct aspects of governance that the authors have delineated from their definition of governance[2].

Believing that perceptions provide the most practical understanding of governance realities, the authors rely exclusively on a variety of perception data to construct the WGI (Kaufmann et al. 2011). These consist of surveys of governed individuals and firms, assessments of governance by experts in both the public sector and in nongovernmental

[2]Kaufmann et al. 2011) define governance as, "the tradition and institutions by which authority in a country is exercised. This includes (a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them" (Kaufmann et al. 2011). 'Voice and Accountability' and 'Political Stability and Absence of Violence/Terrorism' were defined to represent (a), 'Government Effectiveness' and 'Regulatory Quality' were defined to represent (b), and 'Rule of Law' and 'Control of Corruption' were defined to represent (c) (Kaufmann et al. (Kaufmann et al. 2011)

organizations, and related data produced by private information providers (Kaufmann et al. 2011). For each aspect of governance, data from these sources were selected if deemed able to measure that aspect and subsequently rescaled and aggregated in a weighted average using an unobserved components model to construct an overall indicator for that aspect (Kaufmann et al. 2011). These indicators, defined in Table A.1, constitute the WGI.

I examine all six of these indicators for years 1996 to 2013 on the 3020 observations that had scores for each indicator. Scores are normalized with mean 0 and standard deviation of 1, and higher scores are given to countries that acheive better outcomes represented by the indicator.

4.2 The International Country Risk Guide

The International Country Risk Guide, a preemient proprietary risk assessment index that has been produced monthly by The PRS Group since 1984, is composed of three subindexes (IRCG Methodology). Though the economic and financial indexes, standing on five indicators apiece, do not attempt to measure governace capabilities, the third index does. Named the Political Risk Rating, this index advances twelve indicators of "both political and social attributes" of countries that are produced from the answers of ICRG staff to a questionaire (The Political Risk Services Group 2014a). These are listed, with their definitions, in Table A.2.

I examine the values of all twelve of these indicators for the 4,155 observations that had values for each indicator (371 did not). These indicators span the years 1984 to 2014. I assigned annual values to observations of the ICRG using data from October of the

correpsonding year[3]

Each indicator is assigned a maximum value corresponding to how much the ICRG authors believe the indicator impacts overall country risk[4]. The higher the score a country receives on a particular indicator, the smaller the corresponding risk that it faces.

4.3 The Bertelsmann Stiftung's Transformation Index

The Bertelsmann Stiftungs Transformation Index (BTI) has documented the progress of developing and transition countries towards securing democracy and a market economy since 2003. Local experts and scholars are selected by the BTI staff to monitor and document this progress in country analyses, which they use to answer 49 questions that assess various aspects of these determinants. Responses are critiqued and scores are allotted to corresponding subindicators, which are adjusted to ensure consistency across regions. These subindicators are then aggregated into 17 indicators spanning two indexes, the Status Index and the Management Index. The Status Index evaluates the democratic and economic status of nations using Political Transformation indicators and Economic Transformation indicators, whereas the Management Index measures the quality of governance that directs this transformation (Bertlesmann Stiftung 2014a). One indicator, "Level of Difficulty," was dropped from the data set because it was simply a weighting function to aggregate indicators into a comprehensible whole (Bertlesmann Stiftung 2014b). The resulting 16 indicators, and their definitions, are listed in Table A.3 and Table A.4.

[3]I did not average the twelve months of data to produce an annual index because the ICRG data is ordinal, and it does not make sense to average ordinal data.

[4]Government Stability, Socioeconomic Conditions, Internal Conflict, and External Conflict have a maximum value of twelve; Corruption, Military in Politics, Religious Tensions, Law and Order, Ethnic Tensions, and Democratic Accountability have a maximum value of six; Bureaucracy Quality has a maximum value of four. All indicators have a minimum value of zero (The Political Risk Services Group 2014a).

There are 745 observations of these indicators, covering 2003 and biannually since 2006. Higher values of an indicator are awarded to countries (from 0 to 10) demonstrate a corresponding attribute that is better suited to successful transformation.

4.4 The Fragile States Index

The Fund for Peace maintains the Fragile States Index to deliver twelve annual indicators (and more than one hundred sub-indicators) for risk facing countries since 2006. The Fund for Peace searches and synthesizes relevant data from millions of articles and reports into scores for these indicators using its in-house Conflict Assessment System Tool. These scores are then adjusted using further qualitative and quanitative analysis and verification (FFP Methodology). Three classes of indicators — Social, Economic, and Military and Political — make up the Fragile States Index (The Fund For Peace 2014b). These twelve indicators, and their definitions, are listed in Table A.5.

I examine these twelve indicators from years 2006 until 2014, which span 1,565 observations. The indicators assess governance on a zero to ten scale, which higher values of indicators reflecting a more fragile corresponding attribute.

CHAPTER 5

Methodology

Factor analysis is a classification of statistical analyses that reveals the underlying structure responsible for the variation and intercorrelations of observed variables (Matsunaga 2010). There are two types of factor analysis: exploratory factor analysis (EFA) models latent variables that can best explain the variation and intercorrelations of observed variables, and confirmatory factor analysis (CFA) tests how well a model of latent variables can explain the variation and intercorrelations of observed variables (Matsunaga 2010). The difference in the function of these two factor analyses rests on the different assumptions that they bring to bear on the same factor model.

5.1 The Factor Model

5.1.1 Derivation of the Factor Model Problem

The factor model assumes that each observed variable of a data set is a linear combination of their truly fundamental factors. Explictly:

$$\begin{aligned} y_1 &= \mu_1 + l_{11}f_1 + l_{12}f_2 + \ldots + l_{1n}f_n + \varepsilon_1 \\ y_2 &= \mu_2 + l_{21}f_1 + l_{22}f_2 + \ldots + l_{2n}f_n + \varepsilon_2 \\ &\vdots \\ y_m &= \mu_m + l_{m1}f_1 + l_{m2}f_2 + \ldots + l_{mn}f_n + \varepsilon_m \end{aligned} \tag{5.1}$$

such that l_{ij} is the loading of f_j, the j^{th} fundamental factor, on y_i, the i^{th} observed variable. ε_i is the error of measuring y_i such that $Cov(f_i, \varepsilon_i) = 0$, and μ_i is the associated regression intercept (Khattree 2000).

In other words,

$$\mathbf{y} = \boldsymbol{\mu} + \boldsymbol{\Lambda}\mathbf{f} + \boldsymbol{\varepsilon} \tag{5.2}$$

where $\mathbf{y}$ is the m x 1 vector of the observed variables $y_1 \ldots y_m$, $\boldsymbol{\Lambda}$ is the m x n matrix containing the loading l_{ij} as its $(i,j)^{th}$ element, $\mathbf{f}$ is the n x 1 vector of the fundamental factors $f_1 \ldots f_n$, $\boldsymbol{\varepsilon}$ is the m x 1 vector of the error terms $\varepsilon_1 \ldots \varepsilon_m$, and $\boldsymbol{\mu}$ is the m x 1 vector of the intercepts.

The factor model is used to determine the characteristics of the fundamental factors that underly the observed variables. But no information can be drawn from Equation 4.2 because every element on the right hand side of the equation is unobserved. The definition of variance is helpful to manipulate Equation 4.2 into a more useful representation of the factor

model (Hofacker 2007):

$$V(\mathbf{y}) = E[(\mathbf{y} - \boldsymbol{\mu})(\mathbf{y} - \boldsymbol{\mu})'] \tag{5.3}$$

and since from Equation 4.2

$$\mathbf{y} - \boldsymbol{\mu} = \boldsymbol{\Lambda}\mathbf{f} + \boldsymbol{\varepsilon} \tag{5.4}$$

then, as presented in Hofacker (2007),

$$\begin{aligned} V(\mathbf{y}) &= E[(\boldsymbol{\Lambda}\mathbf{f} + \boldsymbol{\varepsilon})(\boldsymbol{\Lambda}\mathbf{f} + \boldsymbol{\varepsilon})'] \\ &= \boldsymbol{\Lambda}E(\mathbf{f}\mathbf{f}')\boldsymbol{\Lambda}' + \boldsymbol{\Lambda}E(\mathbf{f}\boldsymbol{\varepsilon}') + E(\boldsymbol{\varepsilon}\mathbf{f}')\boldsymbol{\Lambda}' + E(\boldsymbol{\varepsilon}\boldsymbol{\varepsilon}') \\ &= \boldsymbol{\Lambda}E(\mathbf{f}\mathbf{f}')\boldsymbol{\Lambda}' + E(\boldsymbol{\varepsilon}\boldsymbol{\varepsilon}') \end{aligned} \tag{5.5}$$

because $Cov(\mathbf{f}, \boldsymbol{\varepsilon}) = 0$

Let $\boldsymbol{\Psi} = Var(\mathbf{f})$, $\boldsymbol{\Theta} = Var(\boldsymbol{\varepsilon})$, and $V(\mathbf{y}) = \boldsymbol{\Sigma}$. Then, as suggested by Harman (1976) and Hofacker (2007),

$$\boldsymbol{\Sigma} = \boldsymbol{\Lambda}\boldsymbol{\Psi}\boldsymbol{\Lambda}' + \boldsymbol{\Theta} \tag{5.6}$$

The population variance-covariance matrix $\boldsymbol{\Sigma}$ is perfectly reproduced by $\boldsymbol{\Lambda}$ and $\boldsymbol{\Psi}$, which belong to the truly fundamental factors, and $\boldsymbol{\Theta}$. But $\boldsymbol{\Lambda}$, $\boldsymbol{\Psi}$ and $\boldsymbol{\Theta}$ are unknown since the dynamics responsible for them are unknown. We are left to estimate these matrices, which produce, as implied by Equation 4.7, an estimate of the population variance-covariance matrix.

$$\widehat{\boldsymbol{\Sigma}} = \widehat{\boldsymbol{\Lambda}}\widehat{\boldsymbol{\Psi}}\widehat{\boldsymbol{\Lambda}}' + \widehat{\boldsymbol{\Theta}} \tag{5.7}$$

The $\widehat{\mathbf{\Lambda}}$, $\widehat{\mathbf{\Psi}}$, and $\widehat{\mathbf{\Theta}}$ that most closely fit $\mathbf{\Lambda}$, $\mathbf{\Psi}$, and $\mathbf{\Theta}$ will produce a $\widehat{\mathbf{\Sigma}}$ that most closely fits $\mathbf{\Sigma}$. So the $\widehat{\mathbf{\Lambda}}$, $\widehat{\mathbf{\Psi}}$, and $\widehat{\mathbf{\Theta}}$ that produce the $\widehat{\mathbf{\Sigma}}$ that most closely fits $\mathbf{\Sigma}$ are those that best fits $\mathbf{\Lambda}$, $\mathbf{\Psi}$, and $\mathbf{\Theta}$. But $\mathbf{\Sigma}$ is also unknown, so we use the sample variance-covariance matrix $\mathbf{S}$ to approximate $\mathbf{\Sigma}(WangandWang2012)$.

The factor model problem is thus

$$\underset{\widehat{\mathbf{\Lambda}},\, \widehat{\mathbf{\Psi}},\, \widehat{\mathbf{\Theta}}}{\text{minimize}} \quad |\mathbf{S} - (\widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Psi}}\widehat{\mathbf{\Lambda}}' + \widehat{\mathbf{\Theta}})| \tag{5.8}$$

so that the resulting $\widehat{\mathbf{\Lambda}}$, $\widehat{\mathbf{\Psi}}$, and $\widehat{\mathbf{\Theta}}$ most accurately fit $\mathbf{\Lambda}$, $\mathbf{\Psi}$, and $\mathbf{\Theta}$ (Wang and Wang 2012).

5.1.2 How the Factor Model Estimates the Factors that Fundamentally Drive the Observed Variables

An important assumption made by the factor model that had no bearing on the above derivation is that $Cov(\varepsilon_i, \varepsilon_j)_{i \neq j} = 0$. This, coupled with the previously declared assumption that $Cov(\mathbf{f}, \boldsymbol{\varepsilon}) = 0$, means that $\varepsilon_i \perp f_k, \varepsilon_{j \neq i}\ \forall\ i, j\ \varepsilon\ \{1 \dots m\}, \forall\ k\ \varepsilon\ \{1 \dots n\}$. Since the variation of an observed variable is only produced by the fundamental forces and its error, the error of a particular observed variable is unable to explain any of the variation of any other observed variable. This means that the error of a particular observed variable is only able to explain variation unique to that variable. This allows us to rename ε_i as the uniqueness of the i^{th} observed variable. $Var(\varepsilon_i)$ is thus the unique variance of the i^{th} observed variable $Var_u(y_i)$.

Solving Equation 4.8 is equivalent to solving

$$\underset{\widehat{\mathbf{\Lambda}},\, \widehat{\mathbf{\Psi}},\, \widehat{\mathbf{\Theta}}}{\text{minimize}} \quad |(\mathbf{S} - \widehat{\mathbf{\Theta}}) - (\widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Psi}}\widehat{\mathbf{\Lambda}}')| \tag{5.9}$$

Since $\mathbf{\Theta} = Var(\boldsymbol{\varepsilon})$, then $\Theta_{ii} = Var(\varepsilon_i) = Var_u(y_i)$ and $\Theta_{ij} = 0 \; \forall i \neq j$.

Since $\mathbf{S}$ is the sample variance-covariance matrix of the observed variables, $\mathrm{S}_{ii} = Var(y_i)$. The variance of the i^{th} variable can be decomposed as the sum of the variance that it shares with others (its common variance, $Var_c(y_i)$) and the variance that it does not share with others ($Var_u(y_i)$). Then $\mathrm{S}_{ii} = Var_c(y_i) + Var_u(y_i)$ and $\mathrm{S}_{ij} = Cov(y_i, y_j) \; \forall i \neq j$ (DeVellis 2012).

It immediately follows that

$$(\mathbf{S} - \widehat{\mathbf{\Theta}})_{ii} = (\mathrm{S}_{ij} - \widehat{\Theta}_{ij}) = (Var_c(y_i) + Var_u(y_i)) - Var_u(y_i) = Var_c(y_i)$$

$$(\mathbf{S} - \widehat{\mathbf{\Theta}})_{ij} = (\mathrm{S}_{ij} - \widehat{\Theta}_{ij}) = Cov(y_i, y_j) - 0 = Cov(y_i, y_j)$$

Every element of $\mathbf{S} - \widehat{\mathbf{\Theta}}$ only represents the communalities of the observed variables, either by representing the variance of an observed variable that is common to others or the covariance of a variable with another(DeVellis 2012). Since the factor model problem amounts to solving Equation 4.9, $\widehat{\mathbf{\Lambda}}$ and $\widehat{\mathbf{\Phi}}$ are chosen to approximate these communalities as closely as possible. Since $\widehat{\mathbf{\Lambda}}$ and $\widehat{\mathbf{\Phi}}$ result from the estimated factor structure, the factor model problem identifies the factors that most closely explain all of the communalities of the observed variables (DeVellis 2012). The factor model thus estimates the factors that are the

fundamental drivers of the observed variables[1]

.

5.2 Exploratory Factor Analysis

5.2.1 Exploratory Factor Analysis

EFA solves the factor model problem (Equation 4.9) to determine the forces that are fundamental to the observed variables. It is suggested to use Principal Factors (PF) to solve EFA's factor model problem[2]

Of note but of no consequence, this technique examines the sample correlation matrix $\mathbf{R}$ rather than the sample variance-covariance matrix $\mathbf{S}$(Preacher and MacCallum 2003)). Indeed, the analysis is the same; the factors that reproduce $\mathbf{R} - \widehat{\mathbf{\Theta}}$ as closely as possible approximate as closely as possible the fundamental factors of the system.

[1]There is considerable general confusion concerning the differences in assumptions and application of factor analysis and the related principal component analysis (PCA) (Fabrigar 1999). The above intuition confirms the use of factor analysis over principal component analysis (PCA) to determine the underlying fundamental structure of a data set. PCA also claims that observed variables are linear combinations of factors called principal components (keeping with the structure of Equation 4.1), but PCA does not make the assumption that $Cov(\varepsilon_i, \varepsilon_j)_{i \neq j} = 0$(Fabrigar 1999). But it was this assumption that allowed FA to determine the factors that are fundamental to the observed variables. Remember that ε_i (along with the extracted factors) explains some of the variation of y_i. Because measurement errors can correlate in PCA, then ε_i captures some of the variation of $y_j \ \forall j \neq i$ (DeVellis 2012). Since observed variables can thus be written as the linear combination of these "measurement errors" and principal components, then the measurement errors of Equation 4.1 in the PCA model are actually just principal components as well. This is why PCA does not include measurement errors in its model. Since the PCA model assumes that the observed variables are the linear combinations of the true principal components, the PCA model estimates the principal components that best represents the total variation of the observed variables (Kolenikov 2009). This means that PCA is an effective data reduction tool (Costello and Osborne 2005). However, since the extracted principal components cannot distinguish between common and unique variation of the data set (Costello and Osborne 2005), the PCA model does not claim to reveal the forces that best represent the communalities of the observed variables; the principal components are not estimates of the fundamental factors of the data set (Harman 1976).

[2]Maximum Likelihood estimates should not be used to produce EFA (Fabrigar 1999). Rather, Principal Factors should be used, especially if data is nonnormal, for it imposes no distributional assumptions on the data. (Fabrigar 1999)

Since $\mathbf{R} - \widehat{\mathbf{\Theta}}$ is symmetric, by eigendecomposition (Khattree 2000 and Cureton 1983)

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = \mathbf{\Upsilon}\mathbf{\Delta}\mathbf{\Upsilon}^{-1} \tag{5.10}$$

where $\mathbf{\Delta}$ is the diagonal matrix of eigenvalues of $\mathbf{R}$ (with $\Delta_{ii} = \delta_i > \delta_j \ \ \forall i, j \mid i < j$) and $\mathbf{\Upsilon}$ is the corresponding martix of orthonormal eigenvectors.

Since $\mathbf{\Upsilon}$ has orthonormal columns, $\mathbf{\Upsilon}^{-1} = \mathbf{\Upsilon}'$. By Cholesky factorization, $\mathbf{\Delta} = (\mathbf{\Delta}^{1/2})'(\mathbf{\Delta}^{1/2})$. But since $\mathbf{\Delta}^{1/2}$ is a diagonal matrix, $(\mathbf{\Delta}^{1/2})' = \mathbf{\Delta}^{1/2}$. Then Equation 4.10 becomes, following (Cureton 1983)

$$\begin{aligned}
(\mathbf{R} - \widehat{\mathbf{\Theta}}) &= \mathbf{\Upsilon}\mathbf{\Delta}\mathbf{\Upsilon}' \\
(\mathbf{R} - \widehat{\mathbf{\Theta}}) &= \mathbf{\Upsilon}(\mathbf{\Delta}^{1/2})'\mathbf{\Delta}^{1/2}\mathbf{\Upsilon}' \\
(\mathbf{R} - \widehat{\mathbf{\Theta}}) &= \mathbf{\Upsilon}\mathbf{\Delta}^{1/2}(\mathbf{\Delta}^{1/2})'\mathbf{\Upsilon}' \\
(\mathbf{R} - \widehat{\mathbf{\Theta}}) &= (\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})'
\end{aligned} \tag{5.11}$$

To determine $(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})$, the diagonal matrix $\widehat{\mathbf{\Theta}}$ must be estimated. PF assumes that $\widehat{\Theta}_{ii} = \frac{1}{R^{-1}_{ii}}$ (Khattree 2000). Then $(R - \widehat{\Theta})_{ii} = 1 - \frac{1}{R^{-1}_{ii}}$ and $(R - \widehat{\Theta})_{ij} = R_{ij} \ \ \forall i \neq j$.[3] With this information, $\mathbf{\Upsilon}$ and $\mathbf{\Delta}^{1/2}$ can be computed.

PF chooses $\widehat{\mathbf{\Lambda}}$ and $\widehat{\mathbf{\Psi}}$ to fit

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = \widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Psi}}\widehat{\mathbf{\Lambda}}' \tag{5.12}$$

Then by combining Equations 4.11 and 4.12, PF chooses $\widehat{\mathbf{\Lambda}}$ and $\widehat{\mathbf{\Psi}}$ to fit

[3] $1 - \frac{1}{R^{-1}_{ii}}$ is called the squared multiple correlation (SMC) of the i^{th} observed variable. The SMC is a commonly used estimate of the communalities of an observed variable with all other variables, and is thus an appropriate assumed estimate of $(R - \widehat{\Theta})_{ii}$)(Khattree and Naik 2000)

$$\widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Psi}}\widehat{\mathbf{\Lambda}}' = (\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})' \tag{5.13}$$

where $(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})'$ represents the communalities of the observed variables.

There are two unknowns, $\widehat{\mathbf{\Lambda}}$ and $\widehat{\mathbf{\Psi}}$. PF needs to make an assumption about one of these to determine the other. PF chooses to assume that $\widehat{\mathbf{\Psi}}$ is the identity matrix, which stipulates that the fundamental forces extracted by PF are orthogonal (Khattree and Naik 2000). This assumption is made without loss of generality of the final result of EFA; though intial factors extracted by PF must be orthogonal by this assumption, rotation techniques are employed following PF to relax this assumption (Khattree and Naik 2000). Then Equation 4.13 becomes

$$\widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Lambda}}' = (\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})(\mathbf{\Upsilon}\mathbf{\Delta}^{1/2})' \tag{5.14}$$

$$\widehat{\mathbf{\Lambda}} = \mathbf{\Upsilon}\mathbf{\Delta}^{1/2} \tag{5.15}$$

where the i^{th} column of $\widehat{\mathbf{\Lambda}}$, the loadings of the i^{th} factor on the observed variables, is formed from the product of the i^{th} eigenvalue δ_i and its corresponding eigenvector. Since $\delta_i > \delta_j \;\; \forall i < j$ and $\widehat{\mathbf{\Psi}} = \mathbf{I}$, the first extracted factor explains the maximum amount of common variation of the observed variables, the second extracted factor explains the maximum amount of common variation of the observed variables that was not explained by the first extracted factor, and so forth.

But in their attempt to explain the maximum amount of common variation of the observed variables, the extracted factors do not attempt to distinguish the specific patterns of common variation produced by the fundamental factors of the variables (Comrey and Lee 1992). Indeed, an extracted factor represents common variation generated by multiple

fundamental factors because the extracted factor attempts to represent as much of the unexplained common variation of the observed variables as possible, even though this common variation is generated by multiple fundamental factors (Comrey and Lee 1992). An extracted factor is thus not a representation of one and only one factor fundamental to the observed variables (Comrey and Lee 1992). This is further evident by the fact that these extracted factors are forced to be orthogonal, though fundamental factors are likely correlated.

To reveal close representations of the fundamental factors, we must rotate the extracted factors. Rotation adjusts the loadings of factors to more accurately represent the specific patterns of common variation of the observed variables[4](Comrey and Lee 1992). The rotated factors are allowed to correlate, which also produces a more realistic estimation of $\widehat{\mathbf{\Psi}}$[5]. In particular, if there exist n fundamental factors, then rotation identifies n factors that are close approximations of the fundamental factors that produced these patterns of common variation.

Given the initial loading matrix $\mathbf{\Lambda}$ for the first n extracted factors, I can choose any orthonormal weight matrix $\mathbf{C}$ as per (B7) to rotate the initially extracted factors that produces a new loading matrix $\mathbf{\Lambda}^*$ following

$$\mathbf{\Lambda}^* = \mathbf{C}^{-1}\mathbf{\Lambda} \tag{5.16}$$

where the correlations of the rotated factors is determined by $\mathbf{\Psi}^* = \mathbf{C}\mathbf{C}'$ (Hofacker

[4]This is admittedly vague, and rotation methods solve whatever optimization problem they believe will produced rotated factors that represent these patterns of common variation. But one common guideline of rotation is to acheive simple structure: observed variables are driven by a limited number of fundamental factors and fundamental factors drive a limited number of observed variables (Comrey and Lee 1992)

[5]This form of rotation is called oblique rotation and is preferred to orthogonal rotation. Orthogonal rotation produces rotated factors that remain orthogonal, which is a strict and likely incorrect assumption placed on the characterization of the fundamental factors (Comrey and Lee 1992).

2007).

It follows that

$$\mathbf{\Lambda} = \mathbf{\Lambda}^*\mathbf{C} \tag{5.17}$$

PF produced estimates for $\widehat{\mathbf{\Lambda}}$ that identify the n factors that most closely fit the common variation and intercorrelations of the observed variables. If PF were to instead estimate $\widehat{\mathbf{\Lambda}^*}$ and $\widehat{\mathbf{\Psi}^*}$ to most closely fit these communalities, it would solve, following (Hofacker 2007)

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = \widehat{\mathbf{\Lambda}^*}\widehat{\mathbf{\Psi}^*}(\widehat{\mathbf{\Lambda}^*})' \tag{5.18}$$

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = \widehat{\mathbf{\Lambda}^*}\mathbf{C}\mathbf{C}'(\widehat{\mathbf{\Lambda}^*})'$$

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = (\widehat{\mathbf{\Lambda}^*}\mathbf{C})(\mathbf{C}'(\widehat{\mathbf{\Lambda}^*})')$$

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = (\widehat{\mathbf{\Lambda}^*}\mathbf{C})(\widehat{\mathbf{\Lambda}^*}\mathbf{C})'$$

$$(\mathbf{R} - \widehat{\mathbf{\Theta}}) = \widehat{\mathbf{\Lambda}}\widehat{\mathbf{\Lambda}}' \tag{5.19}$$

Fitting Equation 4.18 is equivalent to fitting Equation 4.19, which was able to produce the closest approximation, using n factors, of the communalities of the observed variables. In this sense, rotation reveals rotated factors that are just as able as the initially extracted factors to explain the common variation and intercorrelation of the observed variables. Furthermore, the loadings and correlations of these rotated factors are selected to allow these factors to distinguish the fundamental forces that produce the patterns of common variation and intercorrelation of the observed variables (Hofacker 2007). Given that the number of fundamental factors was correctly assumed, these rotated factors, EFA claims, are the closest

representations of the factors that are fundamental to the observed variables (Hofacker 2007)[6]

5.3 Confirmatory Factor Analysis

While EFA hypothesizes the underlying dynamics of observed variables, it is the role of CFA to test the validity of theories of these dynamics. In particular, EFA imposes no structure on how factors relate to observed variables; EFA chooses each value of the loading matrix to produce factors that best explain the observed common variation and intercorrelation of the observed variables. CFA, on the other hand, assumes that factors not theorized to be fundamental to particular observed variables do not load on those variables[7] (Wang and Wang 2012). Theory stipulates that the remaining loadings characterize how observed variables are generated from their fundamental factors. CFA estimates these unrestricted loadings to produce factors, aligned with the theory, that best explain the observed common variation and intercorrelation of the observed variables. CFA then assesses how well these factors are actually able to explain these communalities, which indicates the validity of the theory.

In this sense, CFA amounts to a restricted EFA; both solve the factor model problem, though CFA uses theory to initially restrict the values of certain parameters (Wang and Wang 2012) . It is suggested to solve CFA's factor model problem for non-normal observed variables using Robust Maximum Likelihood.[8]

[6]I used Stata 13.1 to run PF on the indicators. Commonalities were estimated by SMCs. Promax rotation, which is a hybrid of orthogonal and obliquerotation that allows rotated factors to explain as much distinct common variation as possible while still realistically allowing them to be correlated with each other, (Rennie 1997) was used to determine the rotated factors.

[7]This amounts to setting the loading of these factors on those variables to zero.

[8]Maximum Likelihood (ML) is commonly used to estimate the parameters of CFA for continuous data sets, but its standard errors (though not its parameter estimates) are sensitve to nonormality of data sets (Flora and Curran 2004). Applying ML to the asymptotic covariance matrix estimated from the sample correlation matrix produces standard errors that are robust to nonnormality (Brown 2015). I produce the

The estimated parameters produce factors that are the best approximations to the data set given the restrictions of the initial theory. CFA then uses fit indexes to test how well these factors approximate the patterns of commonalities of the data set. The most popular fit index that compares standardized residuals of the observed covariance matrix and the predicted covariance matrix is called the Standardized Root Mean Square Residual (SRMR) (Matsunaga 2010). CFA estimates the value of SRMR, and values of SRMR less than 0.08 indicate that the hypothesized theory is consistent with the observed patterns of commonalities of the data set (Stata 2013).

5.4 How to Use EFA and CFA to Determine the Fundamental Factors of Observed Variables

5.4.1 Pairing EFA and CFA

The distinct functions of EFA and CFA suggest their compatability to determine and validate the fundamental factors of a data set; EFA should be used to construct a theory of the dynamics underlying a data set, and CFA should be used to test the validity of the theory. EFA and CFA should not be both applied to the same observations of the data set[9], however, but rather to distinct randomized samples from the same data set (Cureton and D'Agostino 1983; Fabrigar 1999). The aim of factor analysis is to determine the fundamental factors of the data set, which are consequently the fundamental factors of both randomized samples. Consistency of the theory with the observed variation and intercorrleation of two distinct randomized samples of the same data set provides strong support for the theory's characterization of the fundamental factors of the data set (Cureton and D'Agostino 1983).

asymptotic covariance matrix with Huber White estimators in Stata.

[9]CFA following EFA on the same sample reveals no information. Indeed, this merely amounts to testing the validity of a theory to explain the very variations and intercorrelations of observations that were used to construct the theory.

Conversely, if a theory is not consistent across randomized samples, then the theory does not characterize the fundamental factors of the data set. This is why I choose, when possible, to run CFA on a random subsample of the same data set to confirm the validity of my hypothesized factors. Spurious discrepancies from the commonalities implied by the fundamental factors differ across randomized samples of the same data set. For this reason, if EFA is tricked into approximating the spurious discrepancies of a random sample of a data set, CFA will likely deem these approximations as poor fits of the commonalities of a different random sample of the same data set.

I produced two disjoint randomized samples of observations for each state capability index[10]. For each state capability index, I produced a theory of its fundamental factors by applying EFA to all observations of Group 1. I then tested the validity of this theory to characterize the fundamental factors of the entire data set by applying CFA to all observations of Group 2.

5.4.2 Using EFA to Determine the Number of Fundamental Forces

EFA produces the factors that are the best approximations of an assumed number of fundamental factors of a data set. It is not obvious, however, how many fundamental factors actually exist. Approximations of the complete set of fundamental factors should explain much of the variation of the data set. The amount of variation explained by a set of n factors that approximate the fundamental factors is revealed by the eigenvalues of the first n

[10]For each index, I grouped countries by their development status, according to development status indicated by the World Development Indicators (The World Bank Group 2014). Within each such group, I assigned a random number between 0 and 1 to each country and then ordered countries by the value of their random number. All observations of the countries that had an odd rank within their development group were placed in Group 1 of the index that I call, for example, WGI.1. All other observations were placed in Group 2 of the index, which I call, for example WGI.2.

factors initially extracted by EFA. Assuming that approximations of fundamental factors should explain more variation that that of additional factors that do not approximate truly fundamental factors, the scree test suggests that the first m eigenvalues that are significantly greater than the subsequent eigenvalues implies that there exist at least m fundamental factors (Comrey and Lee 1992)[11].

The scree test only demonstrates how well variation, in aggregate, is explained by a given approximation of fundamental factors. Eigenvalues make no claim, however, about how well these approximations are able to represent the specific patterns of variation that are driven by fundamental factors. An examination of the fit to the observed variables of various sets of factors produced by EFA that best explain an assumed number of fundamental factors speaks to this and suggests stronger evidence concerning how many fundamental factors actually exist. For this reason, an analysis of the redisuals of the covariance matrix of the observed variables implied by the factors produced by EFA and the sample covariance matrix suggests the number of fundamental factors. This analysis is guided by the fact that though fundamental factors explain much of the observed common variation and intercorrelations of the observed variables, they are unable to explain all of these communalities[12]. In this sense, if EFA assumes that there exist fewer fundamental factors than actually exist, it would not produce approximations of every fundamental factor and

[11]Kaiser's criterion is another popular assessment of eigenvalues to determine the number of fundamental forces of a data set. Assuming that approximations of fundamental factors should explain more variation than that of a signle observed variable (corresponding to an eigenvalue of 1) if these factors were truly fundamental to the data set, Kaiser's criterion suggests that m eigenvalues greater than 1 implies that there exist at least m fundamental factors (Preacher and MacCallum 2003). However, Kaiser's criterion must be applied to the eigenvalues of the unreduced correlation matrix, which is produced by PCA, not EFA. Further, it is considered so inaccurate that there is little reason to use it (Comrey and Lee 1992; Fabrigar 1999; Preacher and MacCallum 2003)

[12]Though there may exist two observed variables that are manifestations of the same fundamental factor, they are not exact representations of the factor (or else there would be no difference between these two observed variables). There is thus variation, even spurious common variation and intercorrelations, between observed variables because of the measurement error involved in producing indicators that are driven by the same fundamental factor.

the resulting factors would be unable to explain the esential patterns of observed common variation and intercorrelation of observed variables. If EFA correctly assumes the number of fundamental factors, it would produce factors that closely approximate the fundamental factors, and so would explain the patterns of communalities well. If EFA assumes that there exist more fundamental factors than actually exist, it would also produce approximations of the measurement errors of the observed variables (what is not explained by the fundamental factors), but would misleadingly call these forces fundamental to the data set (Comrey and Lee 1992; Fabrigar 1999).

Sets of factors produced by EFA that do not fit the observed communalities well, as indicated by high residuals[13] between the predicted correlation matrix and the sample correlation matrix, are unlikely to approximate the correct number of fundamental factors. In particular, a high proportion of residuals ¿ 0.05 and several residuals above 0.1 indicate poor fit of the suggested factors to explain the commonalities of the data set (Comrey and Lee 1992). Further, the set of factors that assumes the fewest factors among the sets of factors that properly explain the observed communalities, as indicated by generally low residuals between the predicted correlation matrix and the sample correlation matrix, is the most parsimoius and likely to reveal the true number of fundamental factors of a data set (Fabrigar 1999).

5.4.3 Using EFA to Identify the Fundamental Factors

EFA is used to characterize the fundamental factors of a data set. Once the number of fundamental factors is determined, we must thus characterize the factors that most closely approximate the set of these fundamental factors. Since a loading of a factor on an observed

[13]But for space concerns I choose not to display these redisuals.

variable indicates how much that variable is driven by that factor, factors that load heavily on particular observed variables are thought to drive those indicators. It is commonly assumed that factors that are truly fundamental to observed variables should have loadings that are at least greater than 0.3 (Comrey and Lee 1992; Wang and Wang 2012). A more rigorous analysis of loadings also assumes that factors truly fundamental to a set of observed variables should have loadings on those variables that are significantly greater than loadings on variables that are not thought to be driven by that factor. I use these two rules to determine which observed variables are driven by which factors.

Once I understand which factors produced by EFA drive which observed variables, I then attempt to define these factors to fully characterize the fundamental factors of a data set. Because observed variables that are only driven by one factor are alternative manifestations of the same fundamental factor, I examine the similarities of their definitions in order to suggest the identity of the factor that is fundamental to all of them. This identification must be consistent with the definitions of the observed variables that are driven by this factor as well as by other fundamental factors, and not consistent with the definitions of the observed variables that are not driven by this factor. Once I determined the number, impact, and identity of the factors that most closely represent the fundamental factors of a data set, I produced a model of these hypothesized dynamics.

5.4.4 Using CFA to Verify the Theorized Fundamental Factors

CFA tests if a hypothesized model of the fundamental factors of a data set can predict the observed patterns of communalities of the data set. The most important result of CFA, therefore, is the assessment of the fit of the model to the data set. Further, if a factor actually drives an observed variable, then CFA's parameter estimate for the impact of the

factor on this observed variable should be significant and positive[14]. Verification of the fit and sensibility of the hypothesized model indicate that the model is an accurate representation of the fundamental factors of a data set. This verification alone does not suggest that this model identifies the true dynamic driving the sample, let alone the data set the sample came from. But if CFA verifies that a hypothesized model produced by EFA on a randomized sample of the data set is also able to explain the dynamics of another randomized sample of the data set, it is likely that the model is a true representation of the forces driving the variation of the data set.

[14]But for space concerns I choose not to display these parameter estimates and their standard errors.

CHAPTER 6

Analysis: Identifying the Forces Driving Particular State Capability Indexes

The following determines the underlying factors that drive a particular governance index.

6.1 The Worldwide Governance Indicators

6.1.1 Determining the Number of Forces Driving the WGI

I conducted EFA on the six indicators of the WGI of the first randomized group of countries (WGI.1). Table A.6 displays the eigenvalues of each initially extracted factor.The scree plot of the eigenvalues of Table A.6, displayed in Figure B.1 suggests that only one factor drives the commonalities of the WGI; there appears to be little difference between the eigenvalue of the second extracted factor and that of all subsequent extracted factors.

The loadings of Table A.7, however, indicate that there may be a second factor that drives the communalities of the WGIs; "Political Stability and Absence of Violence / Terrorism" and "Voice and Accountability" are loaded relatively lightly by the first extracted factor compared to the loadings on the other indicators of the WGI. One factor alone may not be sufficient to explain all of the essential patterns of common variation and intercorrelation of the WGIs, though it explains much of the commonalities of the WGI as a whole. Further, a relatively high percentage (20%, 3/15) of the pairwise correlation residuals generated from the predicted correlation matrix using just the first extracted factor are greater than 0.05. One factor alone does not appear to adequately represent the information of the WGI.

I then rotated the first two factors extracted by EFA. Since none of the residuals generated from the estimated correlation matrix using these two factors are greater than 0.05, it indeed appears that two factors drive the commonalities of the WGI. These forces are represented by the rotated first two extracted factors, and the loadings of these forces on each indicator of the WGI are presented in Table A.21.

6.1.2 Identifying the Forces Driving the WGI

To characterize the forces that drive the communalities of the WGI, I have displayed the indicators and their definitions in order of their loadings by the first rotated factor in Table A.8 and by the second rotated factor in Table A.9. As shown by Table A.8, the first force loads heavily on four indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the fourth largest loading of the first force on an indicator is 0.5422, while the fifth largest loading of the first force on an indicator is only 0.3265. It appears that the first force drives the communalities of these four indicators.

As shown by Table A.9, the second force loads heavily on four indicators, and these

loadings are substantially greater than the loadings of this force on the other indicators - the fourth largest loading of the second force on an indicator is 0.3785, while the fifth largest loading of the second force on an indicator is only 0.1330. It appears that the second force drives the communalities of these four indicators.

The names of the indicators that are only driven by the first factor are displayed in bold in Table A.8. Higher values of these two indicators are given to governments that are better able to provide serivces for their citizens and implement sound policies. The fundamental factor of these indicators thus seems to represent a government's competence to provide for its citizens, and I call this fundamental factor "Competence."

The names of the indicators that are only driven by the second factor are displayed in bold in Table A.9. Higher values of these two indicators are given to nations in which citizens have greater control of their government and are less likely to overthrow or subvert the rules of their government. The fundamental factor of these indicators thus seems to represent the vigor of the social contract between citizens and their government, and I call this fundamental factor the "Vigor of Social Contract."

Two indicators are driven by both fundamental forces. Their definitions are consistent with my identification of these fundamental forces. In particular, "Rule of Law" measures both the competence of the government to enforce the legal system (factor 1) and the likelihood that citizens subvert the rules set forth by this legal system (factor 2). "Control of Corruption" measures how much effort governments exert to provide for its citizens (factor 1) and the extent to which governments are controlled by the demands of its citizens (factor 2). Further, my identification of each fundamental force is not consistent with the definitions of the indicators that I believe are not driven by this force.

The above analysis suggests the number, impact, and identity of the forces that drive the commonalities of the WGI. The hypothesized model of this dynamic is presented in Figure B.2.

6.1.3 Verifying the Hypothesized Model

To test its validity to characterize the forces driving the commonalitis of the WGI, I conducted CFA of the hypothesized model on the six indicators of the WGI of the second randomized group of countries (WGI.2). The value of SRMR is 0.025, which indicates that the hypothesized model explains the observed commonalities of the sample very well. Furthermore, the parameter estimates are significant and consistent with the hypothesized model. CFA confirms the validity of the hypothesized model to characterize the factors that drive the commonalities of this randomized sample of the WGI.

The hypothesized model characterizing the forces driving the commonalities of the WGI was determined through EFA on one random sample of observations of the WGI and confirmed through CFA on a disjoint random sample of observations of the WGI. The model presented in Figure B.2 thus characterizes the forces that drive the commonalities of the WGI.

6.2 The International Country Risk Guide

6.2.1 Determining the Number of Forces Driving the ICRG

I conducted EFA on the twelve indicators of the ICRG of the first randomized group of countries (ICRG.1). Table A.6 displays the eigenvalues of each initially extracted factor. The scree plot of the eigenvalues of Table A.6, displayed in Figure B.1, suggests that three factors

drive the variation of the ICRG; there is quite a difference between the eigenvalue of the third extracted factor and that of the fourth extracted factor, though there appears to be little difference between the eigenvalue of the fourth extracted factor and that of all subsequent extracted factors.

Analysis of the pairwise correlation residuals of the predicted correlation matrix generated by EFA's best approximation of an alternative number of fundamental factors corroborates the suggestion of the scree plot. A very high percentage (62%, 41/66) of these residuals using just the first extracted factor are greater than 0.05, with 18 of them greater than 0.1 and the maximum residual as large as 0.2918. A high percentage (43.9%, 29/66) of these residuals using the first two rotated factors are greater than 0.05, with 8 of them greater than 0.1 and the maximum residual as large as 0.1909. But a much smaller percentage (16.7%, 11/66) of these residuals using the rotated first three extracted factors are greater than 0.05. and only one residual, with value 0.1049, is greater than 0.1. It indeed appears that three forces drive the commonalities of the ICRG. These forces are represented by the rotated first three extracted factors, and the loadings of these forces on each indicator of the ICRG are presented in Table A.21.

6.2.2 Identifying the Forces Driving the ICRG

To characterize the forces that drive the communalities of the ICRG, I have displayed the indicators and their definitions in order of their loadings by the first rotated factor in Table A.10, by the second rotated factor in Table A.11, and by the third rotated factor in Table A.12. As shown by Table A.10, the first force loads heavily on six indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the sixth largest loading of the first force on an indicator is 0.5321, while the seventh largest loading of the first force on an indicator is only 0.2645. It appears that the first force drives

the communalities of these six indicators.

As shown by Table A.11, the second force loads heavily on four indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the fourth largest loading of the second force on an indicator is 0.5367, while the fifth largest loading of the second force on an indicator is only 0.3245. It appears that the second force drives the communalities of these four indicators.

As shown by Table A.12, the third force loads heavily on two indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the second largest loading of the third force on an indicator is 0.6515, while the third largest loading of the second force on an indicator is only 0.2901. It appears that the third force drives the communalities of these two indicators.

Each indicator of the ICRG is only driven by one fundamental factor. The names of the indicators that are only driven by the first factor are displayed in bold in Table A.10. Higher values of these six indicators are given to governments that are both more willing and able to effectively serve its citizens. The fundamental factor of these indicators thus seems to represent the quality of governance. Since the definitions of the remaining indicators, whose names are not listed in bold in Table A.10, are not consistent with this identification, I call this fundamental factor the "Quality of Governance."

The names of the indicators that are only driven by the second factor are displayed in bold in Table A.11. Higher values of these four indicators reflect a reduced prevalence of tensions and conflict at work in a country. Since the definitions of the remaining indicators, whose names are not listed in bold in Table A.11, are not consistent with this identification,

I call this fundamental factor "Lack of Tensions and Conflict."

The names of the indicators that are only driven by the third factor are displayed in bold in Table A.12. Higher values of these two indicators reflect an increased faith in the government and the legitimacy of the transactions within its society. The fundamental factor of these indicators thus seems to represent a perception of legitimacy . Since the definitions of the remaining indicators, whose names are not listed in bold font in Table A.12, are not consistent with this identification, I call this fundamental factor "Legitimacy."

The above analysis suggests the number, impact, and identity of the forces that drive the commonalities of the ICRG. The hypothesized model of this dynamic is presented in Figure B.3.

6.2.3 Verifying the Hypothesized Model

To test its validity to characterize the forces driving the commonalities of the ICRG, I conducted CFA of the hypothesized model on the twelve indicators of the ICRG of the second randomized group of countries (ICRG.2). The value of SRMR was 0.062, which indicates that the hypothesized model explains the observed commonalities of the sample quite well. Furthermore, the parameter estimates are significant and consistent with the hypothesized model. CFA confirms the validity of the hypothesized model to characterize the factors that drive the commonalities of this randomized sample of the ICRG.

The hypothesized model characterizing the forces driving the commonalities of the ICRG was determined through EFA on one random sample of observations of the ICRG and confirmed through CFA on a disjoint random sample of observations of the ICRG. The model presented in Figure B.3 thus characterizes the forces that drive the variation of the ICRG.

6.3 The Bertlesmann Stiftung's Transformation Index

6.3.1 Determining the Number of Forces Driving the BTI

I conducted EFA on the sixteen indicators of the BTI of the first randomized group of countries. Table A.6 displays the eigenvalues of each initially extracted factor. The scree plot of the eigenvalues of Table A.6, displayed in Figure B.1, suggests that two factors drive the commonalities of the BTI; there appears to be a difference betwween the eigenvalue of the second extracted factor and that of the third extracted factor, while there appears to be little difference between the eigenvalue of the third extracted factor and that of all subsequent extracted factors.

Analysis of the pairwise correlation residuals of the predicted correlation matrix generated by EFA's best approximation of an alternative number of fundamental factors verifies the suggested number of forces driving the commonalities of the BTI. A very high percentage (70%, 84/120) of these residuals using just the first extracted factor are greater than 0.05, with 38 of them greater than 0.1 and the maximum residual as large as 0.2971. A very low percentage (10%, 12/120) of these residuals using the rotated first two extracted factors are greater than 0.05, on the other hand, and only one residual, with value 0.1005, is greater than 0.1. It indeed appears that two forces drive the commonalities of the BTI. These forces are represented by the rotated first two extracted factors, and the loadings of these forces on each indicator of the BII are presented in Table A.21.

6.3.2 Identifying the Forces Driving the BTI

To characterize the forces that drive the communalities of the BTI, I have displayed the indicators and their definitions in order of their loadings by the first rotated factor in Table A.13 and by the second rotated factor in Table A.14. As shown by Table A.13, the first force

loads heavily on eleven indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the eleventh largest loading of the first force on an indicator is 0.5066, while the twelveth largest loading of the first force on an indicator is only 0.1411. It appears that the first force drives the communalities of these eleven indicators.

As shown by Table A.14, the second force loads heavily on nine indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the ninth largest loading of the second force on an indicator is 0.3134, while the tenth largest loading of the second force on an indicator is only 0.2614. It appears that the second force drives the communalities of these nine indicators.

The names of the indicators that are only driven by the first factor are displayed in bold in Table A.13. Higher values of these seven indicators are given to governments that are more responsive to the wills of its citizens and more politically savvy. The fundamental factor of these indicators thus seems to represent the political gumption of a government. Governments with more political gumption are more spirited in their response to the demands of its citizens and consequently muster greater political energy and resourcefulness to satisfy these demands. I thus call this fundamental factor "Political Gumption."

The names of the indicators that are only driven by the second factor are displayed in bold in Table A.14. Higher values of these five indicators are given to governments that support and acheive better societal outcomes. The fundamental factor of these indicators thus seems to represent the societal outcomes produced by a government, and I call this fundamental factor the "Outcomes."

Four indicators are driven by both fundamental forces. Their definitions are consistent with my identification of these fundamental forces. In particular, each of these indicators measures the quality of the support produced by the political system (factor 1) in order to produce better outcomes for its citizens (factor 2). Further, my identification of each fundamental force is not consistent with the definitions of the indicators that I believe are not driven by this force.

The above analysis suggests the number, impact, and identity of the forces that drive the commonalities of the BTI. The hypothesized model of this dynamic is presented in Figure B.4.

6.3.3 Verifying the Hypothesized Model

To test its validity to characterize the forces driving the commonalities of the BTI, I conducted CFA of the hypothesized model on the sixteen indicators of the BTI of the second randomized group of countries (BTI.2). The value of SRMR was 0.058, which indicates that the hypothesized model explains the observed commonalities of the sample quite well. Furthermore, the parameter estimates are significant and consistent with the hypothesized model. CFA confirms the validity of the hypothesized model to characterize the factors that drive the commonalities of this randomized sample of the ICRG.

The hypothesized model characterizing the forces driving the variation of the BTI was determined through EFA on one random sample of observations of the BTI and confirmed through CFA on a disjoint random sample of observations of the BTI. The model presented in Figure B.4 thus characterizes the forces that drive the variation of the BTI.

6.4 The Fragile State Index

6.4.1 Determining the Number of Forces Driving the FSI

I conducted EFA on the twelve indicators of the FSI of the first randomized group of countries (FSI.1). Table A.6 displays the eigenvalues of each initially extracted factor. The scree plot of the eigenvalues of Table A.6, displayed in Figure B.1, suggests that only one factor drives the commonalities of the FSI; there appears to be little difference between the eigenvalue of the second extracted factor and that of all subsequent extracted factors.

The loadings of Table A.7, however, indicate that there may be a second force that drives the commonalities of the FSI; several indicators, especially "Refugees and IDPs," are loaded relatively lightly by the first extracted factor compared to the loadings on the other indicators of the FSI. One factor alone may not be sufficient to explain all of the essential patterns of common variation and intercorrelation of the FSI, though it explains much of the commonalities of the FSI as a whole. Further, a high percentage (34.8%, 23/66) of the pairwise correlation residuals generated from the estimated correlation matrix using just the first extracted factor are greater than 0.05. One factor alone does not appear to adequately represent the information of the FSI.

I then rotated the first two factors extracted by EFA. Since a much lower percentage (10.6%, 7/66) of the residuals generated from the estimated correlation matrix using these two factors are greater than 0.05, it indeed appears that two forces drive the commonalities of the FSI. These forces are represented by the rotated first two extracted factors, and the loadings of these forces on each indicator of the FSI are presented in Table A.21.

6.4.2 Identifying the Forces Driving the FSI

To characterize the forces that drive the communalities of the FSI, I have displayed the indicators and their definitions in order of their loadings by the first rotated factor in Table A.15 and by the second rotated factor in Table A.16. As shown by Table A.15, the first force loads heavily on seven indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the seventh largest loading of the first force on an indicator is 0.4407, while the eigth largest loading of the first force on an indicator is only 0.3159. It appears that the first force drives the communalities of these seven indicators.

As shown by Table A.16, the second force loads heavily on six indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the sixth largest loading of the second force on an indicator is 0.4902, while the seventh largest loading of the second force on an indicator is 0.3431. It appears that the second force drives the communalities of these six indicators.

The names of the indicators that are only driven by the first factor are displayed in bold in Table A.15. Higher values of these six indicators reflect increased group differences and tensions at work in a country. The fundamental factor of these indicators thus seems to represent these group differences and tensions and I call this fundamental factor "Group Differences and Tensions."

The names of the indicators that are only driven by the second factor are displayed in bold in Table A.16. Higher values of these five indicators are given to less effective governments who are less able to provide services and better outcomes for their citizens. The fundamental factor of these indicators thus seems to represent the extent to which a government lacks the competence to provide for its citizens, and I call this fundamental

factor the "Lack of Competence."

One indicator is driven by both fundamental forces - "Uneven Economic Development." Its definition is consistent with my identification of these fundamental forces. In particular, this indicator measures disparities of economic outcomes (factor 2) across ethnic and religious groups (factor 1). Further, my identification of each fundamental force is not consistent with the definitions of the indicators that I believe are not driven by this force.

The above analysis suggests the number, impact, and identity of the forces that drive the commonalities of the FSI. The hypothesized model of this dynamic is presented in Figure B.5.

6.4.3 Verifying the Hypothesized Model

To test its validity to characterize the forces driving the commonalities of the FSI, I conducted CFA of the hypothesized model on the twelve indicators of the FSI of the second randomized group of countries (FSI.2). The value of SRMR was 0.045, which indicates that the hypothesized model explains the observed commonalities of the sample very well. Furthermore, the parameter estimates are significant and consistent with the hypothesized model. CFA confirms the validity of the hypothesized model to characterize the factors that drive the commonalities of this randomized sample of the FSI.

The hypothesized model characterizing the forces driving the commonalities of the FSI was determined through EFA on one random sample of observations of the FSI and confirmed through CFA on a disjoint random sample of observations of the FSI. The model presented in Figure B.5 thus characterizes the forces that drive the commonalities of the FSI.

6.5 Discussion

I have identified the best approximations of the factors that explain the patterns of common variation and intercorrelation of each studied state capability index. But are these the truly fundamental factors of these indexes? Even more provacatively, are some of these factors fundamental to not just one index, but several? After all, WGI "Competence," ICRG "How Well Governed," BTI "Outcomes," and FSI "Competence" are all identified similarly, as are ICRG "Lack of Tensions and Conflict" and FSI "Group Differences and Tensions." Could it be that these factors are fundamental across state capability indexes? The following is an attempt to determine the truly fundamental factors that drive state capability indexes.

CHAPTER 7

Analysis: Identifying the Fundamental Factors of State Capability Indexes

7.1 Preparing the Data for This Analysis

To permit an analysis of the factors driving the commonalities of the four state capability indexes, I merged their information and examined those observations (of a particular country in a particular year) that were assigned values by each index. This sample is subsequently referred to as "All Indexes"[1] Unfortunately, the resulting number of indicators (46) was too great for CFA to be run on a random half of the resulting sample (which would only be 203 observations) for it to be identified, or the results of EFA to have much power. For this

[1]Because the countries received high values on the indicators of the FSI for poor outcomes, I subtracted the values of these indicators from 10 to produce new indicators whose measurement scale aligns with the indicators of the other index. I thus also flip the identification of the fundamental factors of the FSI - "Group Differences and Tensions" becomes "Absence of Group Differences and Tensions*" and "Lack of Competence" becomes "Competence*."

reason, I conducted EFA on all of the observations of "All Indexes," but not CFA. This procedure maximizes the likelihood of the validity of my results; EFA is required, not CFA, to reveal the unknown dynamics of a data set, and examining all of the observations of the data set provides me with a big enough sample to prevent nonnormality from warping EFA's approximation of the fundamental factors of the data set (Fabrigar 1999).

Of course, there is a chance that spurious discrepancies from the commonalities that are implied by the true fundamental factors may be so prevalent in the data set that EFA is tricked into approximating these spurious deviations rather than strictly the true fundamental factors. But each model produced by EFA in Chapter 5 was consistent, per CFA, across randomized samples of data sets[2]. Consistency of the model produced by EFA on "All Indexes" with the models that were produced by EFA and verified by CFA for each particular index therefore would suggest the ability of my model of "All Indexes" to actually represent the fundamental structure of "All Indexes." I thus conduct EFA on all observations of "All Indexes" and test its consistency with the previously verified models.

7.2 Determining the Number of Fundamental Factors of State Capability Indexes

Table A.6 displays the eigenvalues of the first ten initially extracted factors. Since the first four factors have eigenvalues greater than 1, Kaiser's criterion suggests that four factors drive the commonalities of "All Indexes." The scree plot of the eigenvalues of Table A.6, displayed in Figure B.6, corroborates this hypothesis; there appears to be a difference between the eigenvalue of the fourth extracted factor and that of the fifth extracted factor,

[2]This itself is a heartening suggestion of the rigor of my EFA procedure alone to determine the fundamental structure of a data set.

but there appears to be very little difference between the eigenvalue of the fifth extracted factor and that of all subsequent extracted factors.

Analysis of the pairwise correlation residuals of the predicted correlation matrix generated by EFA's best approximation of an alternative number of fundamental factors verifies the suggested number of forces driving the commonalities of "All Indexes." While 16.04% (166/1035) of these residuals using the first three extracted factors are greater than 0.05, (with 29 of them greater than 0.1 and the maximum residual as large as 0.1898), a much lower percentage (7.53%, 78/1035) of these residuals using the rotated first four extracted factors are greater than 0.05 (with only 8 of them greater than 0.1 and maximum residual 0.1564). It indeed appears that four forces drive the commonalities of "All Indexes." These forces are represented by the rotated first four extracted factors, and the loadings of these forces on each indicator of "All Indexes" are presented in Table A.22.

7.3 Identifying the Fundamental Factors of State Capability Indexes

To characterize the forces that drive the communalities of "All Indexes," I have displayed the indicators and their definitions in order of their loadings by the first rotated factor in Table A.17, by the second rotated factor in Table A.18, by the third rotated factor in Table A.19, and by the fourth rotated factor in Table A.20. As shown by Table A.17, the first force loads heavily on 26 indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the 26^{th} largest loading of the first force on an indicator is 0.3351, while the 27^{th} largest loading of the first force on an indicator is only 0.2537 It appears that the first force drives the communalities of these 26 indicators.

As shown by Table A.18, the second force loads heavily on 17 indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the 17^{th} largest loading of the second force on an indicator is 0.3840 while the 18^{th} largest loading of the second force on an indicator is only 0.2964. It appears that the second force drives the communalities of these 17 indicators.

As shown by Table A.19, the third force loads heavily on nine indicators, and these loadings are substantially greater than the loadings of this force on the other indicators - the ninth largest loading of the third force on an indicator is 0.4797, while the tenth largest loading of the third force on an indicator is only 0.3140. It appears that the third force drives the communalities of these nine indicators.

As shown by Table A.20, the fourth force loads heavily on four indicators, and these loadings are greater than the loadings of this force on the other indicators - the fourth largest loading of the fourth force on an indicator is 0.3484, while the fifth largest loading of the fourth force on an indicator is 0.3027. It appears that the fourth force drives the communalities of these four indicators.

The names of the indicators that are only driven by the first factor are displayed in bold in Table A.17. Higher values of these 18 indicators are given to more effective governments that are able to achieve better outcomes for their citizens. The fundamental factor of these indicators thus seems to represent the effectiveness of governments, in the sense that more effective governments use their greater competencies to be better able to implement more sound policies that more substantially improve outcomes for their citizens. I call this fundamental factor "Effectiveness."

The names of the indicators that are only driven by the second factor are displayed in bold in Table A.18. Higher values of these 10 indicators are given to governments that are more responsive to the wills of its citizens and more politically savvy. The fundamental factor of these indicators thus seems to represent the political gumption of a government. Governments with more political gumption are more spirited in their response to the demands of its citizens and consequently muster greater political energy and resourcefulness to satisfy these demands. I thus call this fundamental factor "Political Gumption."

Six indicators are driven by the first and second factor. Their definitions are consistent with my identification of these factors. In particular, each of these indicators measures the quality of the support produced by the political system (factor 2) in order to produce better outcomes for its citizens (factor 1).

The names of the indicators that are only driven by the third factor are displayed in bold in Table A.19. Higher values of these seven indicators reflect fewer tensions, conflict, and other pressures afflicting a country that spring from group dynamics within the country itself. The fundamental factor of these indicators thus seems to represent the extent of internal pressures in a country, in the sense that these pressures result from the tensions and conflicts between groups of citizens. I call this fundamental factor "Absence of Internal Tensions."

One indicator is driven by the first and third factors - "Security Apparatus." Its definition is consistent with my identification of these fundamental forces. Indeed, "Security Apparatus" measures how well the government is able to maintain its monopoly on the use of force (factor 1) given power struggles between groups (factor 3).

One indicator is driven by the second and third factors - "Factionalized Elites." Its definition is consistent with my identification of these fundamental forces. Indeed, "Factionalized Elites" measures the extent to which different groups struggle (factor 3) in political deadlock and brinksmanship for political gain at the expense of satisfying the will of its citizens (factor 2).

The names of the indicators that are only driven by the fourth factor are displayed in bold in Table A.20 Higher values of these two indicators reflect fewer pressures exerted on the government from both external forces and disapproval of its citizens. The fundamental factor of these indicators thus seems to represent the extent of pressures exterted on governments that are not generated from internal group tensions. Without more definitions to hone a more specific identification, however, I call this fundamental factor "Popular Support and Absence of External Pressures." Note that these two types of pressures are not addressed by my identification of the third fundamental factor.

One indicator is driven by just the first and fourth factors - "Investment Profile." Its definition is consistent with my identification of these fundamental forces. In particular, "Investment Profile" measures the extent to which investment outcomes (factor 1) are placed at risk (factor 4).

One indicator is driven by the first, second and fourth factors - "Currency and Price Stability." Its definition is also consistent with my identification of these fundamental forces. In particular, "Currency and Price Stability" measures the extent to which inflation, exchange rates, and general macroeconomic outcomes (factor 1) are stabilized (factor 4) by political precautions.

Further, my identification of each fundamental force is not consistent with the definitions of the indicators that I believe are not driven by this force.

The above analysis suggests the number, impact, and identity of the forces that drive the commonalities of "All Indexes."

7.4 Making Sense of the Fundamental Factors of State Capability Indexes

7.4.1 Consistency of the Fundamental Factors of All State Capability Indexes with the Fundamental Factors of Each Particular Index

These four factors were produced as the best approximations of the factors that are fundamental to all of the indicators of the WGI, ICRG, BTI, and FSI. Since they represent the factors that are fundamental to the indicators of all indexes, they must also be fundamental to the indicators of particular indexes. In this sense, the factors fundamental to all indexes and the factors fundamental to each particular index must be consistent if I have determined the true fundamental factors underlying all four of the state capability indexes.

7.4.1.1 Fundamental Factor 1: "Effectiveness"

The first fundamental factor to all indicators, "Effectiveness," is overwhelmingly consistent with the fundamental factors. Indeed, as demonstrated in Figure B.11, it overwhelmingly drives similarly identified notions of WGI "Competence," ICRG "Quality of Governance," BTI "Outcomes," and FSI "Competence."

The second, third, and fourth fundamental factors to all indicators are also overwhelmingly consistent with the identified notions that were thought to drive the commonalities of each particular index. But their loadings on indicators also reveals something important about these factors - each of these factors fundamental to all indicators are able to differentiate an indicator from within particular indexes. Indeed, this is entirely consistent with factor analysis; if " Democratic Accountability" does not share common patterns of variation and intercorrelation with the other indicators of the WGI, factor analysis will be unable to tell that there is a fundamental factor of"Democratic Accountability." But analyzing the patterns of commonalities across all indicators places together some of the indicators that are driven by the same fundamental factor and allows them to show that they represent the same underlying notion. In this sense, slight discrepancies in how the fundamental factors of all indicators seem to explain the factors fundamental to particular indexes is actually quite intuitive. It is only when we combine indexes may the truly fundamental factors be revealed.

7.5 Taking a Step Back

7.5.1 The Fundamental Forces that Produce State Capability Outcomes

Each indicator is a manifestation of these fundamental factor. These indicators represent the capability of states to deliver outcomes for their citizens, and so too do factors that drive them represent the capability of states to deliver outcomes. Indeed, they suggest an interesting story of how these fundamental elements of state capability interact to influence how capable a state is to deliever outcomes to its citizens.

Factor analysis reveals there are four fundamental elements of a state's capability to

deliver outcomes for its citizens. I name these four elements (1) "Effectiveness;" (2) "Political Gumption;" (3) "Absence of Internal Tensions;" and (4) "Popular Support and Absence of External Pressures." "Political Gumption" of a state represents the responsiveness and political resourcefulness that a government musters to satisfy the demands of its citizens. The outcomes that are actually delivered to its citizens are determined by the state's level of "Effectiveness" to implement its desires. Further, "Absence of Internal Tensions and "Popular Support and Absence of External Pressures" represent the amount of pressure exerted on the state that disrupt its ability to implement its desired level of outcomes for its citizens. The indicators of the four studied state capability indexes are manifestations of these fundamental elements.

7.5.2 Intuition of this Dynamic

As a further confirmation of the validity of my analysis to determine the fundamental determinants of the capability of states to deliver outcomes for its citizens, the predicted values of these fundamental determinants for states holds with intuition.

Singapore, widely accepted as the worlds most effective state, indeed receives the highest score for "Effectiveness." Somalia, which is essentially not a state that is virtually unable to implement any of its desires, receives the lowest score for "Effectiveness." North Korea, a repressive dictatorship, receives the lowest score for "Political Gumption." Pakistan and Sudan, both routed by severe internal conflict, receive the lowest scores for Absence of Internal Pressures. Venezuela, buffeted by high inflation, volatile oil prices, and increasing popular unrest, receives the lowest score for "Absence of External Pressures."

Nuances in the values of these predictions for particular countries further corroborate the consistency of these factors relative to each other. Brazil, a regional champion of

democracy, has a relatively much higher value for "Political Gumption" than the other determinants. Nigeria, home to the terrorism of Boko Haram, receives an exceptionally low value for "Absence of Internal Pressures." Argentina, at the mercy of a crippling inflation rate, receives an exceptionally low value for Popular Support and Absence of External Pressures, despite receiving substantially higher values for the other fundamental determinants.

CHAPTER 8

Discussion

In the first valid investigation of what state capability indexes actually measure, I have determined that there are four fundamental elements of how capable a state is to deliver outcomes for its citizens. These fundamental elements combined to represent the forces that drove the variation of each particular index. Since these indexes were studied for their distinctions, it is likely that this conclusion generalizes to all other indexes of state capability.

This is fascinating; despite the attempts of experts to pick apart many distinct aspects of institutions, there are only four fundamental forces that determine the capabilities of a nation. This reduces the incredibly vauge and fuzzy definitions of institutions into concrete fundamental notions that can be readily understood and more easily measured. By identifying these fundamental elements of state capability, it is now possible to develop causal mechanisms that explain their determinants, and thus the determinants of outcomes across the world.

APPENDIX A

Tables

Table A.1: Definitions of the Indicators of the Worldwide Governance Indicators

Indicator	Definition
Control of Corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
Government Effectiveness	Reflects perceptions of the quality of public services, the quality of the civil serivce and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Political Stability and Absence of Violence/Terrorism	Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
Regulatory Quality	Reflects Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Rule of Law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Voice and Accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

These are the definitions of the indicators of the Worldwide Governace Indicators (Kaufmann et al. 2013).

Table A.2: Definitions of the Indicators of the International Country Risk Guide

Indicator	Definition
Bureaucracy Quality	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Corruption	A measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.
Democratic Accountability	A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.
Ethnic Tensions	A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise.
External Conflict	A measure of both the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: War, Cross-Border Conflict, and Foreign Pressures.
Government Stability	A measure of both of the governments ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and Popular Support.
Internal Conflict	A measure of political violence in the country and its actual or potential impact on governance. The risk rating assigned is the sum of three subcomponents: Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder.
Investment Profile	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays.
Law and Order	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law.
Military in Politics	A measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government will almost certainly diminish effective governmental functioning, become corrupt, and create an uneasy environment for foreign businesses.
Religious Tensions	A measure of religious tensions arising from the domination of society and/or governance by a single religious group – or a desire to dominate – in a way that replaces civil law by religious law, excludes other religions from the political/social processes, suppresses religious freedom or expressions of religious identity. The risks involved range from inexperienced people imposing inappropriate policies to civil dissent or civil war.
Socioeconomic Conditions	A measure of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty.

These are the definitions of the indicators of the International Country Risk Guide (The Political Risk Services Group 2014b).

Table A.3: Definitions of the Indicators of the Bertelsmann Stiftung's Transformation Index

Indicator	Sub-Index	Definition
Stateness	Political	There is clarity about the nations existence as a state with adequately established and differentiated power structures.
Political Participation	Political	The populace decides who rules, and it has other political freedoms.
Rule of Law	Political	State powers check and balance one another and ensure civil rights.
Stability of Democratic Institutions	Political	Democratic institutions are capable of performing, and they are adequately accepted.
Political and Social Integration	Political	Stable patterns of representation exist for mediating between society and the state; there is also a consolidated civic structure.
Level of Socioeconomic Development	Economic	In principle, the country's level of development permits adequate freedom of choice for all citizens.
Organization of the Market and Competition	Economic	There are clear rules for stable, market-based competition.
Currency and Price Stability	Economic	There are institutional or political precautions to control inflation sustainably, together with an appropriate monetary policy and fiscal policy.
Private Property	Economic	There are adequate conditions to support a functional private sector.
Welfare Regime	Economic	There are viable arrangements to compensate for social risks.
Economic Perfomance	Economic	The economy's performance points to solid development.
Sustainability	Economic	Economic growth is balanced, environmentally sustainable and future-oriented.
Steering Capability	Management	The government manages reforms effectively and can acheive its policy priorities.
Resource Efficiency	Management	The government makes optimum use of available resources.
Consensus-Building	Management	The political leadership establishes a broad consensus on reform with other actors in society without sacrificing its reform goals.
International Cooperation	Management	The political leadership is willing and able to cooperate with external supporters and organizations.

These are the definitions of the indicators of the Bertlesmann Stiftung's Transformation Index (Bertlesmann Stiftung 2014c).
See Table A.4 for a listing of the questions that were assigned to determine the values of each of these indicators.

Table A.4: The Information Revealed by the Bertelsmann Stiftung's Transformation Index

Indicator	Questions
Stateness	To what extent does the states monopoly on the use of force cover the entire territory of the country? To what extent do all relevant groups in society agree about citizenship and accept the nation-state as legitimate? To what extent are legal order and political institutions defined without interference by religious dogmas? To what extent do basic administrative structures exist?
Political Participation	To what extent are political representatives determined by general, free and fair elections? To what extent do democratically elected political representatives have the effective power to govern, or to what extent are there veto powers and political enclaves? To what extent can individuals form and join independent political or civic groups? To what extent can these groups operate and assemble freely? To what extent can citizens, organizations and the mass media express opinions freely?
Rule of Law	To what extent is there a working separation of powers (checks and balances)? To what extent does an independent judiciary exist? To what extent are public officeholders who abuse their positions prosecuted or penalized? To what extent are civil rights guaranteed and protected, and to what extent can citizens seek redress for violations of these rights?
Stability of Democratic Institutions	Are democratic institutions capable of performing? To what extent are democratic institutions accepted as legitimate by the relevant actors?
Political and Social Integration	To what extent is there a stable and socially rooted party system able to articulate and aggregate societal interests? To what extent is there a network of cooperative associations or interest groups to mediate between society and the political system? How strong is the citizens approval of democratic norms and procedures? To what extent have social self-organization and the construction of social capital advanced?
Level of Socioeconomic Development	To what extent are significant parts of the population fundamentally excluded from society due to poverty and inequality?
Organization of the Market and Competition	To what level have the fundamentals of market-based competition developed? To what extent do safeguards exist to prevent the development of economic monopolies and cartels, and to what extent are they enforced? To what extent has foreign trade been liberalized? To what extent have a solid banking system and a functioning capital market been established?
Currency and Price Stability	To what extent do government and central bank pursue a consistent inflation policy and an appropriate foreign exchange policy? To what extent do the governments fiscal and debt policies support macroeconomic stability?
Private Property	To what extent do government authorities ensure well-defined rights of private property and regulate the acquisition, benefits, use and sale of property? To what extent are private companies permitted and protected? Are privatization processes conducted in a manner consistent with market principles?
Welfare Regime	To what extent do social safety nets provide compensation for social risks? To what extent does equality of opportunity exist?
Economic Perfomance	How does the economy, as measured in quantitative indicators, perform?
Sustainability	To what extent are environmental concerns effectively taken into account in both macro and microeconomic terms? To what extent are there solid institutions for basic, secondary and tertiary education, as well as for research and development?
Steering Capability	To what extent does the government set and maintain strategic priorities? How effective is the government in implementing its own policies? How innovative and flexible is the government?
Resource Efficiency	To what extent does the government make efficient use of available human, financial and organizational resources? To what extent can the government coordinate conflicting objectives into a coherent policy? To what extent does the government successfully contain corruption?
Consensus-Building	To what extent do the major political actors agree on democracy and a market economy as strategic, long-term goals? To what extent can reformers exclude or co-opt anti-democratic actors? To what extent is the political leadership able to moderate cleavage-based conflict? To what extent does the political leadership enable the participation of civil society in the political process? To what extent can the political leadership bring about reconciliation between the victims and perpetrators of past injustices?
International Cooperation	To what extent does the political leadership use the support of international partners to implement a long-term strategy of development? To what extent does the government act as a credible and reliable partner in its relations with the international community? To what extent is the political leadership willing and able to cooperate with neighboring countries?

The score a country receives on a particular indicator of the Bertlesmann Stiftung's Transformation Index is developed to directly answer the corresponding questions (Bertlesmann Stiftung 2014c.

Table A.5: Definitions of the Fragile State Index

Indicator	Indicator Class	Definition
Demographic Pressures	Social	Pressures on the population such as disease and natural disasters make it difficult for the government to protect its citizens or demonstrate a lack of capacity or will.
Group Grievance	Social	When tension and violence exist between groups, the state's ability to provide security is undermined and fear and further violence may ensue.
Human Flight and Brain Drain	Social	When there is little opportunity, people migrate, leaving a vacuum of human capital. Those with resources also oten leave before, or just as, conflict erupts.
Refugees and IDPs	Social	Pressures associated with population displacement. These strain public sercices and have the potential to pose a security threat.
Poverty and Economic Decline	Economic	Poverty and economic decline strain the ability of the state to provide for its citizens if they cannot provide for themselves and can create friction between the "haves" and the "have nots."
Uneven Economic Development	Economic	When there are ethnic, religious, or regional disparities, the governed tend to be uneven in their commitment to the social contract.
External Intervention	Political and Military	When the state fails to meet its international or domestic obligation, external actors may intervene to provide services or to manipulate internal affairs.
Factionalized Elites	Political and Military	When local and national leaders engage in deadlock and brinksmanship for political gain, this undermines the social contract.
Human Rights and Rule of Law	Political and Military	When human rights are violated or unevenly protected, the state is failing in its ultimate responsibility.
Public Services	Poliitcal and Military	The provision of health, education, and sanitation services, among others, are key roles of the state.
Security Apparatus	Political and Military	The security apparatus should have a monopoly on the use of legitimate force. The social contract is weakned where this is affected by competing groups.
State Legitimacy	Political and Military	Corruption and a lack of representatives in the government directly undermine the social contract.

These are the definitions of the indicators of the FSI (The Fund for Peace 2014a).

Table A.6: Eigenvalues from Each Initial EFA

WGI		ICRG		BTI		FSI		All	
	Eigenvalue		Eigenvalue		Eigenvalue		Eigenvalue		Eigenvalue
Factor 1	4.87344	Factor 1	5.30221	Factor 1	11.76590	Factor 1	9.11163	Factor 1	26.62249
Factor 2	0.16647	Factor 2	0.82149	Factor 2	1.36921	Factor 2	0.54524	Factor 2	4.68747
Factor 3	0.03293	Factor 3	0.69957	Factor 3	0.62611	Factor 3	0.27545	Factor 3	2.39943
Factor 4	-0.03038	Factor 4	0.25976	Factor 4	0.27301	Factor 4	0.16059	Factor 4	1.42644
Factor 5	-0.03673	Factor 5	0.10152	Factor 5	0.09547	Factor 5	0.11854	Factor 5	0.81646
Factor 6	-0.06605	Factor 6	0.10152	Factor 6	0.02872	Factor 6	0.00884	Factor 6	0.59916
		Factor 7	-0.02033	Factor 7	-0.00089	Factor 7	-0.00220	Factor 7	0.54351
		Factor 8	-0.09174	Factor 8	-0.00324	Factor 8	-0.03059	Factor 8	0.52534
		Factor 9	-0.10905	Factor 9	-0.01417	Factor 9	-0.04750	Factor 9	0.39186
		Factor 10	-0.13150	Factor 10	-0.02156	Factor 10	-0.05404	Factor 10	0.34381
		Factor 11	-0.14123	Factor 11	-0.02395	Factor 11	-0.07003		
		Factor 12	-0.23515	Factor 12	-0.02660	Factor 12	-0.09033		
				Factor 13	-0.03611				
				Factor 14	-0.04174				
				Factor 15	-0.04815				
				Factor 16	-0.08909				
N	1609	N	2183	N	373	N	785	N	406

The second, fourth, sixth, and eighth columns display the eigenvalues of the factors extracted by applying EFA on the indicators of each index of the first randomized group of countries. The tenth column displays the eigenvalues of the factors extracted by applying EFA on all of the indicators of all four indexes of the observations that had values for each of these indicators.

Table A.7: Loadings of First Factor Extracted by Initial EFA of the WGI and FSI

WGI		FSI	
Indicator	Factor 1	Indicator	Factor 1
Control of Corruption	0.9555	Demographic Pressures	0.9061
Government Effectiveness	0.9605	Refugees and IDPs	0.7614
Political Stability and Absence of Violence / Terrorism	0.7637	Group Grievance	0.8395
Regulatory Quality	0.9257	Human Flight and Brain Drain	0.8162
Rule of Law	0.9729	Uneven Economic Development	0.8645
Voice and Accountability	0.8068	Poverty and Economic Decline	0.8279
		State Legitimacy	0.9236
		Public Services	0.9126
		Human Rights	0.8939
		Security Apparatus	0.9285
		Factionalized Elites	0.9002
		External Intervention	0.8657

(a) These are the loadings on observed variables of the first factor extracted by EFA for the first group of randomized countries of the WGI.

(b) These are the loadings on observed variables of the first factor extracted by EFA for the first group of randomized countries of the FSI.

Table A.8: Ordered Factor Loadings on the First Force Driving the WGI

Indicator	Loading	Definition
Government Effectiveness	0.8727	Reflects perceptions of the **quality of public services**, the **quality of the civil serivce** and the degree of its independence from political pressures, the **quality of policy formulation and implementation**, and the credibility of the government's commitment to such policies.
Regulatory Quality	0.8672	Reflects Perceptions of the **ability of the government to formulate and implement sound policies and regulations** that permit and promote private sector development.
Control of Corruption[2]	0.6355	Reflects perceptions of the **extent to which public power is exercised for private gain**, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
Rule of Law[2]	0.5422	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the **quality of contract enforcement, property rights, the police, and the courts**, as well as the likelihood of crime and violence.
Voice and Accountability	0.3265	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political Stability and Absence of Violence/Terrorism	0.1108	Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

These are the ordered loadings on the first force driving the WGI.

Table A.9: Ordered Factor Loadings on the Second Force Driving the WGI

Indicator	Loading	Definition
Political Stability and Absence of Violence/Terrorism	0.7225	Reflects perceptions of the **likelihood that the government will be destabilized or overthrown** by unconstitutional or violent means, including politically-motivated violence and terrorism.
Voice and Accountability	0.5418	Reflects perceptions of the extent to which a **country's citizens are able to participate in selecting their government**, as well as freedom of expression, freedom of association, and a free media.
Rule of Law[1]	0.4941	Reflects perceptions of the extent to which agents have confidence in and **abide by the rules of society**, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the **likelihood of crime and violence**.
Control of Corruption[1]	0.3785	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of **corruption**, as well as **"capture" of the state by elites and private interests**.
Government Effectiveness	0.1330	Reflects perceptions of the quality of public services, the quality of the civil serivce and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory Quality	0.1005	Reflects Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

These are the ordered loadings on the second force driving the WGI.

Table A.10: Ordered Factor Loadings on the First Force Driving the ICRG

Indicator	Loading	Definition
Bureaucracy Quality	0.9027	**Institutional strength and quality of the bureaucracy** is a **shock absorber** that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Corruption	0.7418	A **measure of corruption within the political system** that is a threat to foreign investment by distorting the economic and financial environment, reducing the **efficiency of government and business** by enabling people to assume positions of power through patronage rather than ability, and introducing **inherent instability into the political process**.
Socioeconomic Conditions	0.6871	A measure of the **socioeconomic pressures at work** in society **that could constrain government action** or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty.
Military in Politics	0.5678	A **measure of the military's involvement in politics**. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government **will almost certainly diminish effective governmental functioning**, become corrupt, and create an uneasy environment for foreign businesses.
Law and Order	0.5402	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the **strength and impartiality of the legal system**, and the "order" sub-component assesses **popular observance of the law**.
Democratic Accountability	0.5321	A measure of, not just whether there are free and fair elections, but **how responsive government is to its people**. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.
Investment Profile	0.2645	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays.
Religious Tensions	0.1417	A measure of religious tensions arising from the domination of society and/or governance by a single religious group – or a desire to dominate – in a way that replaces civil law by religious law, excludes other religions from the political/social processes, suppresses religious freedom or expressions of religious identity. The risks involved range from inexperienced people imposing inappropriate policies to civil dissent or civil war.
Internal Conflict	0.0725	A measure of political violence in the country and its actual or potential impact on governance. The risk rating assigned is the sum of three subcomponents: Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder.
Ethnic Tensions	−0.0107	A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise.
External Conflict	−0.0250	A measure of both the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: War, Cross-Border Conflict, and Foreign Pressures.
Government Stability	−0.1675	A measure of both of the governments ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and Popular Support.

These are the ordered loadings on the first force driving the ICRG.

Table A.11: Ordered Factor Loadings on the Second Force Driving the ICRG

Indicator	Loading	Definition
Internal Conflict	0.7030	A measure of **political violence in the country** and its actual or potential impact on governance. The risk rating assigned is the sum of three subcomponents: **Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder**.
External Conflict	0.6439	A measure of both the **risk to the incumbent government from foreign action**, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: **War, Cross-Border Conflict, and Foreign Pressures**.
Ethnic Tensions	0.6072	A measure of the **degree of tension attributable to racial, national, or language divisions**. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are **intolerant and unwilling to compromise**.
Religious Tensions	0.5367	A measure of **religious tensions arising from the domination of society and/or governance by a single religious group – or a desire to dominate** – in a way that replaces civil law by religious law, **excludes other religions from the political/social processes, suppresses religious freedom** or expressions of religious identity. The risks involved range from inexperienced people imposing inappropriate policies to civil dissent or civil war.
Military in Politics	0.3245	A measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government will almost certainly diminish effective governmental functioning, become corrupt, and create an uneasy environment for foreign businesses.
Democratic Accountability	0.2914	A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.
Law and Order	0.2750	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law.
Corruption	0.1659	A measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.
Government Stability	0.0842	A measure of both of the governments ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and Popular Support.
Investment Profile	−0.0408	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays.
Bureaucracy Quality	−0.0896	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Socioeconomic Conditions	−0.1542	A measure of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty.

These are the ordered loadings on the second force driving the ICRG.

Table A.12: Ordered Factor Loadings on the Third Force Driving the ICRG

Indicator	Loading	Definition
Government Stability	0.6673	A measure of both of the governments ability to carry out its declared program(s), and its **ability to stay in office**. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and **Popular Support**.
Investment Profile	0.6515	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: **Contract Viability/Expropriation, Profits Repatriation, and Payment Delays**.
Socioeconomic Conditions	0.2901	A measure of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty.
Internal Conflict	0.2374	A measure of political violence in the country and its actual or potential impact on governance. The risk rating assigned is the sum of three subcomponents: Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder.
Law and Order	0.1830	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law.
Ethnic Tensions	0.1243	A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise.
External Conflict	0.1106	A measure of both the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: War, Cross-Border Conflict, and Foreign Pressures.
Bureaucracy Quality	0.0513	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Military in Politics	0.0449	A measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government will almost certainly diminish effective governmental functioning, become corrupt, and create an uneasy environment for foreign businesses.
Democratic Accountability	−0.1518	A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.
Religious Tensions	−0.1798	A measure of religious tensions arising from the domination of society and/or governance by a single religious group – or a desire to dominate – in a way that replaces civil law by religious law, excludes other religions from the political/social processes, suppresses religious freedom or expressions of religious identity. The risks involved range from inexperienced people imposing inappropriate policies to civil dissent or civil war.
Corruption	−0.2274	A measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.

These are the ordered loadings on the third force driving the ICRG.

Table A.13: Ordered Factor Loadings on the First Force Driving the BTI

Indicator	Loading	Definition
Political Participation	1.0220	The **populace decides who rules**, and it has **other political freedoms**.
Stability of Democratic Institutions	1.0002	**Democratic institutions are capable of performing**, and they are adequately **accepted**.
Consensus-Building	0.9300	The political leadership establishes a **broad consensus on reform with other actors** in society without sacrificing its reform goals.
Political and Social Integration	0.8586	**Stable patterns of representation exist for mediating between society and the state**; there is also a consolidated **civic structure**.
Rule of Law	0.8470	**State powers check and balance one another** and **ensure civil rights**.
International Cooperation	0.8252	The **political leadership is willing and able to cooperate** with external supporters and organizations.
Steering Capability	0.7581	The **government** manages reforms effectively and **can acheive its policy priorities**.
Private Property[2]	0.6590	There are adequate conditions to support a **functional private sector**.
Currency and Price Stability[2]	0.5757	There are **institutional or political precautions to control inflation** sustainably, together with an **appropriate monetary policy and fiscal policy**.
Organization of the Market and Competition[2]	0.5660	There are **clear rules for stable, market-based competition**.
Resource Efficiency[2]	0.5066	The **government makes optimum use of available resources**.
Economic Performance	0.1411	The economy's performance points to solid development.
Sustainability	0.1286	Economic growth is balanced, environmentally sustainable and future-oriented.
Stateness	0.1052	There is clarity about the nations existence as a state with adequately established and differentiated power structures.
Welfare Regime	0.0502	There are viable arrangements to compensate for social risks.
Level of Socioeconomic Development	−0.1314	In principle, the country's level of development permits adequate freedom of choice for all citizens.

These are the ordered loadings on the first force driving the BTI.

Table A.14: Ordered Factor Loadings on the Second Force Driving the BTI

Indicator	Loading	Definition
Level of Socioeconomic Development	0.9734	In principle, **the country's level of development** permits adequate freedom of choice for all citizens.
Welfare Regime	0.9085	There are **viable arrangements to compensate for social risks**.
Sustainability	0.8634	**Economic growth is balanced**, environmentally **sustainable** and future-oriented.
Stateness	0.7207	There is clarity about the nations existence as a state with adequately **established and differentiated power structures**.
Economic Performance	0.6484	The economy's performance points to **solid development**.
Resource Efficiency[1]	0.5243	The government makes **optimum use of available resources**.
Organization of the Market and Competition[1]	0.4392	There are **clear rules for stable, market-based competition**.
Currency and Price Stability[1]	0.3411	There are **institutional or political precautions to control inflation** sustainably, together with an appropriate monetary policy and fiscal policy.
Private Property[1]	0.3134	There are adequate conditions to support a **functional private sector**.
Steering Capability	0.2614	The government manages reforms effectively and can acheive its policy priorities.
Rule of Law	0.1502	State powers check and balance one another and ensure civil rights.
International Cooperation	0.0796	The political leadership is willing and able to cooperate with external supporters and organizations.
Political and Social Integration	0.0679	Stable patterns of representation exist for mediating between society and the state; there is also a consolidated civic structure.
Consensus-Building	0.0510	The political leadership establishes a broad consensus on reform with other actors in society without sacrificing its reform goals.
Stability of Democratic Institutions	−0.0662	Democratic institutions are capable of performing, and they are adequately accepted.
Political Participation	−0.1304	The populace decides who rules, and it has other political freedoms.

These are the ordered loadings on the second force driving the BTI.

Table A.15: Ordered Factor Loadings on the First Force Driving the FSI

Indicator	Loading	Definition
Factionalized Elites	0.8850	When local and national **leaders engage in deadlock and brinksmanship for political gain**, this undermines the social contract.
Group Grievance	0.8557	When **tension and violence exist between groups**, the state's ability to provide security is undermined and **fear and further violence may ensue**.
Human Rights and Rule of Law	0.7733	When **human rights are violated or unevenly protected**, the state is failing in its ultimate responsibility.
State Legitimacy	0.7506	Corruption and a l**ack of representatives in the government directly undermine the social contract**.
Security Apparatus	0.7025	The security apparatus should have a **monopoly on the use of legitimate force**. The social contract is weakened where this is affected by **competing groups**.
Refugees and IDPs	0.4760	**Pressures associated with population displacement**. These strain public sercices and have the potential to pose a security threat.
Uneven Economic Development[2]	0.4407	When there are **ethnic, religious, or regional disparities**, the governed tend to be uneven in their commitment to the social contract.
External Intervention	0.3159	When the state fails to meet its international or domestic obligation, external actors may intervene to provide services or to manipulate internal affairs.
Human Flight and Brain Drain	0.2387	When there is little opportunity, people migrate, leaving a vacuum of human capital. Those with resources also oten leave before, or just as, conflict erupts.
Demographic Pressures	0.1380	Pressures on the population such as disease and natural disasters make it difficult for the government to protect its citizens or demonstrate a lack of capacity or will.
Public Services	0.1306	The provision of health, education, and sanitation services, among others, are key roles of the state.
Poverty and Economic Decline	0.0538	Poverty and economic decline strain the ability of the state to provide for its citizens if they cannot provide for themselves and can create friction between the "haves" and the "have nots."

These are the ordered loadings on the first force driving the FSI.

Table A.16: Ordered Factor Loadings on the Second Force Driving the FSI

Indicator	Loading	Definition
Public Services	0.8554	The **provision of health, education, and sanitation services**, among others, are key roles of the state.
Poverty and Economic Decline	0.8413	**Poverty and economic decline** strain the **ability of the state to provide for its citizens** if they cannot provide for themselves and can create friction between the **"haves" and the "have nots**."
Demographic Pressures	0.8408	Pressures on the population such as **disease and natural disasters make it difficult for the government to protect its citizens or demonstrate a lack of capacity or will**.
Human Flight and Brain Drain	0.6418	When there is **little opportunity**, people migrate, leaving a **vacuum of human capital**. Those with resources also oten leave before, or just as, conflict erupts.
External Intervention	0.6175	**When the state fails to meet its international or domestic obligation**, external actors may **intervene to provide services** or to manipulate internal affairs.
Uneven Economic Development[1]	0.4902	When there are ethnic, religious, or regional **disparities**, the governed tend to be uneven in their commitment to the social contract.
Refugees and IDPs	0.3431	Pressures associated with population displacement. These strain public sercices and have the potential to pose a security threat.
Security Apparatus	0.2951	The security apparatus should have a monopoly on the use of legitimate force. The social contract is weakned where this is affected by competing groups.
State Legitimacy	0.2412	Corruption and a lack of representatives in the government directly undermine the social contract.
Human Rights and Rule of Law	0.1863	When human rights are violated or unevenly protected, the state is failing in its ultimate responsibility.
Factionalized Elites	0.0802	When local and national leaders engage in deadlock and brinksmanship for political gain, this undermines the social contract.
Group Grievance	0.0442	When tension and violence exist between groups, the state's ability to provide security is undermined and fear and further violence may ensue.

These are the ordered loadings on the second force driving the FSI.

Table A.17: Ordered Factor Loadings on the First Force Driving "All Indexes"

Indicator	Index	Loading	Definition
Public Services	FSI	0.9864	The provision of health, education, and sanitation services, among others, are key roles of the state.
Level of Socioeconomic Development	BTI	0.9297	In principle, the country's level of development permits adequate freedom of choice for all citizens.
Poverty and Economic Decline	FSI	0.9143	Poverty and economic decline strain the ability of the state to provide for its citizens if they cannot provide for themselves and can create friction between the "haves" and the "have nots."
Socioeconomic Conditions	ICRG	0.8966	A measure of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents: Unemployment, Consumer Confidence, and Poverty.
Demographic Pressures	FSI	0.8575	Pressures on the population such as disease and natural disasters make it difficult for the government to protect its citizens or demonstrate a lack of capacity or will.
Government Effectiveness	WGI	0.7995	Reflects perceptions of the quality of public services, the quality of the civil serivce and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Welfare Regime	BTI	0.7896	There are viable arrangements to compensate for social risks.
Bureaucracy Quality	ICRG	0.7507	Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.
Sustainability	BTI	0.7415	Economic growth is balanced, environmentally sustainable and future-oriented.
Human Flight and Brain Drain	FSI	0.7320	When there is little opportunity, people migrate, leaving a vacuum of human capital. Those with resources also oten leave before, or just as, conflict erupts.
Uneven Economic Development	FSI	0.7223	When there are ethnic, religious, or regional disparities, the governed tend to be uneven in their commitment to the social contract.
Rule of Law	WGI	0.6801	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of Corruption	WGI	0.6306	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
Economic Performance	BTI	0.5990	The economy's performance points to solid development.
Law and Order	ICRG	0.5877	Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law.
Regulatory Quality[2]	WGI	0.5488	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Resource Efficiency[2]	BTI	0.5071	The government makes optimum use of available resources.
Organization of the Market and Competition[2]	BTI	0.4971	There are clear rules for stable, market-based competition.
External Intervention	FSI	0.4916	When the state fails to meet its international or domestic obligation, external actors may intervene to provide services or to manipulate internal affairs.
Corruption	ICRG	0.4599	A measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.
Private Property[2]	BTI	0.4562	There are adequate conditions to support a functional private sector.
Investment Profile[4]	ICRG	0.4531	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays.
Currency and Price Stability[2,4]	BTI	0.3687	There are institutional or political precautions to control inflation sustainably, together with an appropriate monetary policy and fiscal policy.
Security Apparatus[3]	FSI	0.3584	The security apparatus should have a monopoly on the use of legitimate force. The social contract is weakned where this is affected by competing groups.
Legitimacy of the State[2]	FSI	0.3566	Corruption and a lack of representatives in the government directly undermine the social contract.
Military in Politics	ICRG	0.3351	A measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government will almost certainly diminish effective governmental functioning, become corrupt, and create an uneasy environment for foreign businesses.
Refugees and IDPs	FSI	0.2537	Pressures associated with population displacement. These strain public sercices and have the potential to pose a security threat.

These are the ordered loadings on the first force driving "All Indexes." The indicators displayes with bolded names load heavily on this force.

Table A.18: Ordered Factor Loadings on the Second Force Driving "All Indexes"

Indicator	Index	Loading	Definition
Political Participation	BTI	1.1083	The populace decides who rules, and it has other political freedoms.
Stability of Democratic Institutions	BTI	1.0685	Democratic institutions are capable of performing, and they are adequately accepted.
Political and Social Integration	BTI	0.987	Stable patterns of representation exist for mediating between society and the state; there is also a consolidated civic structure.
Voice and Accountability	WGI	0.9692	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Democratic Accountability	ICRG	0.9496	A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.
Rule of Law	BTI	0.9103	State powers check and balance one another and ensure civil rights.
Consensus-Building	BTI	0.8984	The political leadership establishes a broad consensus on reform with other actors in society without sacrificing its reform goals.
Steering Capability	BTI	0.7865	The government manages reforms effectively and can acheive its policy priorities.
International Cooperation	BTI	0.7443	The political leadership is willing and able to cooperate with external supporters and organizations.
Human Rights and Rule of Law	FSI	0.6474	When human rights are violated or unevenly protected, the state is failing in its ultimate responsibility.
Private Property[1]	BTI	0.6222	There are adequate conditions to support a functional private sector.
Organization of the Market and Competition[1]	BTI	0.5926	There are clear rules for stable, market-based competition.
State Legitimacy[1]	FSI	0.4833	Corruption and a lack of representatives in the government directly undermine the social contract.
Currency and Price Stability[1,4]	BTI	0.4622	There are institutional or political precautions to control inflation sustainably, together with an appropriate monetary policy and fiscal policy.
Regulatory Quality[1]	WGI	0.4194	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Factionalized Elites[3]	FSI	0.3946	When local and national leaders engage in deadlock and brinksmanship for political gain, this undermines the social contract.
Resource Efficiency[1]	BTI	0.3840	The government makes optimum use of available resources.
Sustainability	BTI	0.2964	Economic growth is balanced, environmentally sustainable and future-oriented.

These are the ordered loadings on the second force driving "All Indexes." The indicators displayes with bolded names load heavily on this force.

Table A.19: Ordered Factor Loadings on the Third Force Driving "All Indexes"

Indicator	Index	Loading	Definition
Political Stability and Absence of Violence/Terrorism	WGI	0.7571	Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
Internal Conflict	ICRG	0.7542	A measure of political violence in the country and its actual or potential impact on governance. The risk rating assigned is the sum of three subcomponents: Civil War/Coup Threat, Terrorism/Political Violence, and Civil Disorder.
Religious Tensions	ICRG	0.7345	A measure of religious tensions arising from the domination of society and/or governance by a single religious group – or a desire to dominate – in a way that replaces civil law by religious law, excludes other religions from the political/social processes, suppresses religious freedom or expressions of religious identity. The risks involved range from inexperienced people imposing inappropriate policies to civil dissent or civil war.
Group Grievance	FSI	0.6869	When tension and violence exist between groups, the state's ability to provide security is undermined and fear and further violence may ensue.
Ethnic Tensions	ICRG	0.6349	A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise.
Stateness	BTI	0.5903	There is clarity about the nations existence as a state with adequately established and differentiated power structures.
Refugees and IDPs	FSI	0.5687	Pressures associated with population displacement. These strain public sercices and have the potential to pose a security threat.
Factionalized Elites[2]	FSI	0.4870	When local and national leaders engage in deadlock and brinksmanship for political gain, this undermines the social contract.
Security Apparatus[1]	FSI	0.4797	The security apparatus should have a monopoly on the use of legitimate force. The social contract is weakned where this is affected by competing groups.
External Conflict	ICRG	0.3140	A measure of both the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: War, Cross-Border Conflict, and Foreign Pressures.

These are the ordered loadings on the third force driving "All Indexes." The indicators displayes with bolded names load heavily on this force.

Table A.20: Ordered Factor Loadings on the Fourth Force Driving "All Indexes"

Indicator	Index	Loading	Definition
Government Stability	ICRG	0.5873	A measure of both of the governments ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents: Government Unity, Legislative Strength, and Popular Support.
External Conflict	ICRG	0.4917	A measure of both the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents: War, Cross-Border Conflict, and Foreign Pressures.
Investment Profile[1]	ICRG	0.4540	A measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits Repatriation, and Payment Delays.
Currency and Price Stability[1,2]	BTI	0.3484	There are institutional or political precautions to control inflation sustainably, together with an appropriate monetary policy and fiscal policy.
Political Stability and Absence of Violence/Terrorism	WGI	0.3027	Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

These are the ordered loadings on the fourth force driving "All Indexes." The indicators displayes with bolded names load heavily on this force.

Table A.21: Loadings of the Rotated Factors Determined by EFA on the Indicators of the First Group of Randomized Countries of Each Index

WGI		
Indicator	Factor 1	Factor 2
Control of Corruption	**0.6355**	0.3785
Government Effectiveness	**0.8727**	0.1330
Political Stability and Absence of Violence / Terrorism	0.1108	**0.7225**
Regulatory Quality	**0.8672**	0.1005
Rule of Law	**0.5442**	**0.4941**
Voice and Accountability	0.3265	**0.5418**

ICRG			
Indicator	Factor 1	Factor 2	Factor 3
Bureaucracy Quality	**0.9027**	-0.0896	0.0513
Corruption	**0.7418**	0.1659	-0.2274
Democratic Accountability	**0.5321**	0.2914	-0.1518
Ethnic Tensions	-0.0107	**0.6072**	0.1243
External Conflict	-0.0250	**0.6439**	0.1106
Government Stability	-0.1675	0.0842	**0.6673**
Internal Conflict	0.0725	**0.7030**	0.2374
Investment Profile	0.2645	-0.0408	**0.6515**
Law and Order	**0.5402**	0.2750	0.1830
Military in Politics	**0.5678**	0.3245	0.0449
Religious Tensions	0.1417	**0.5367**	-0.1798
Socioeconomic Conditions	**0.6871**	-0.1542	0.2901

BTI		
Indicator	Factor 1	Factor 2
Stateness	0.1052	**0.7207**
Political Participation	**1.0220**	-0.1304
Rule of Law	**0.8470**	0.1502
Stability of Democratic Institutions	**1.0002**	-0.0662
Political and Social Integration	**0.8586**	0.0679
Level of Socioeconomic Development	-0.1314	**0.9734**
Organization of the Market and Competition	**0.5660**	**0.4392**
Currency and Price Stability	**0.5757**	**0.3411**
Private Property	**0.6590**	**0.3134**
Welfare Regime	0.0503	**0.9085**
Economic Performance	0.1411	**0.6484**
Sustainability	0.1286	**0.8634**
Steering Capability	**0.7581**	0.2614
Resource Efficiency	**0.5066**	**0.5304**
Consensus-Building	**0.9300**	0.0510
International Cooperation	**0.8252**	0.0796

FSI		
Indicator	Factor 1	Factor 2
Demographic Pressures	0.1380	**0.8408**
Refugees and IDPs	**0.4760**	0.3431
Group Grievance	**0.8557**	0.0442
Human Flight and Brain Drain	0.2387	**0.6418**
Uneven Economic Development	**0.4407**	**0.4902**
Poverty and Economic Decline	0.0538	**0.8413**
State Legitimacy	**0.7506**	0.2412
Public Services	0.1306	**0.8554**
Human Rights and Rule of Law	**0.7733**	0.1863
Security Apparatus	**0.7025**	0.2951
Factionalized Elites	**0.8850**	0.0802
External Intervention	0.3159	**0.6175**

Table A.22: Loadings of the Rotated Factors Determined by EFA on All of the Indicators

Indicators of the WGI				
Indicator	Factor 1	Factor 2	Factor 3	Factor 4
Control of Corruption	**0.6306**	0.1261	0.0833	0.2404
Government Effectiveness	**0.7995**	0.1889	-0.0880	0.1748
Political Stability and Absence of Violence / Terrorism	0.1126	0.0093	**0.7571**	0.3027
Regulatory Quality	**0.5488**	**0.4194**	-0.1098	0.2598
Rule of Law	**0.6801**	0.1533	0.0221	0.2752
Voice and Accountability	-0.0146	**0.9692**	0.0825	-0.0676

Indicators of the BTI				
Indicator	Factor 1	Factor 2	Factor 3	Factor 4
Stateness	0.2294	0.2212	**0.5903**	0.0296
Political Participation	-0.2513	**1.1083**	0.0618	-0.1482
Rule of Law	0.1257	**0.9103**	0.0278	-0.0695
Stability of Democratic Institutions	-0.2277	**1.0685**	0.0899	-0.1220
Political and Social Integration	-0.0031	**0.9870**	0.0122	-0.1679
Level of Socioeconomic Development	**0.9297**	0.0589	0.0768	-0.2425
Organization of the Market and Competition	**0.4971**	**0.5926**	-0.1214	0.0703
Currency and Price Stability	**0.3687**	**0.4622**	-0.1310	**0.3484**
Private Property	**0.4562**	**0.6222**	-0.1463	0.0952
Welfare Regime	**0.7896**	0.1796	0.1412	-0.1586
Economic Performance	**0.5990**	0.1302	-0.0760	0.2834
Sustainability	**0.7415**	0.2964	0.0690	-0.1312
Steering Capability	0.1231	**0.7865**	0.0321	0.1217
Resource Efficiency	**0.5071**	**0.3840**	0.0828	0.1754
Consensus-Building	-0.0242	**0.8984**	0.1336	0.0368
International Cooperation	0.0200	**0.7443**	0.0320	0.2957

Indicators of the ICRG				
Indicator	Factor 1	Factor 2	Factor 3	Factor 4
Bureaucracy Quality	**0.7507**	0.2035	-0.1896	-0.0233
Corruption	**0.4599**	0.0864	-0.0011	0.3001
Democratic Accountability	-0.0399	**0.9496**	-0.1347	-0.1448
Ethnic Tensions	0.1997	-0.2459	**0.6349**	0.0240
External Conflict	-0.1321	0.2242	0.3140	**0.4917**
Government Stability	-0.0620	-0.5158	0.2458	**0.5873**
Internal Conflict	0.0135	-0.0085	**0.7542**	0.2531
Investment Profile	**0.4531**	0.1377	-0.0831	**0.4540**
Law and Order	**0.5877**	-0.3906	0.2025	0.2118
Military in Politics	**0.3351**	0.2472	0.2683	0.1527
Religious Tensions	-0.2307	0.1401	**0.7345**	-0.0046
Socioeconomic Conditions	**0.8966**	-0.2163	0.0221	0.1190

Indicators of the FSI				
Indicator	Factor 1	Factor 2	Factor 3	Factor 4
Demographic Pressures	**0.8575**	-0.0244	0.2229	-0.2518
Refugees and IDPs	0.2537	0.1354	**0.5687**	-0.0242
Group Grievance	0.1564	0.1678	**0.6869**	0.1288
Human Flight and Brain Drain	**0.7320**	-0.3184	0.2477	0.0747
Uneven Economic Development	**0.7223**	-0.0253	0.2723	-0.1613
Poverty and Economic Decline	**0.9143**	-0.0508	-0.0941	-0.0181
State Legitimacy	**0.3566**	**0.4833**	0.2760	-0.0025
Public Services	**0.9864**	-0.0626	0.0970	-0.1704
Human Rights	0.2209	**0.6474**	0.2933	-0.0586
Security Apparatus	**0.3584**	0.2593	**0.4797**	0.0411
Factionalized Elites	0.1398	**0.3946**	**0.4870**	0.1355
External Intervention	**0.4916**	0.0951	0.2889	0.0871

APPENDIX B

Figures

Figure B.1: Scree Plots of the Eigenvalues Produced by Applying EFA On The Indicators Of A Particular State Capability Index

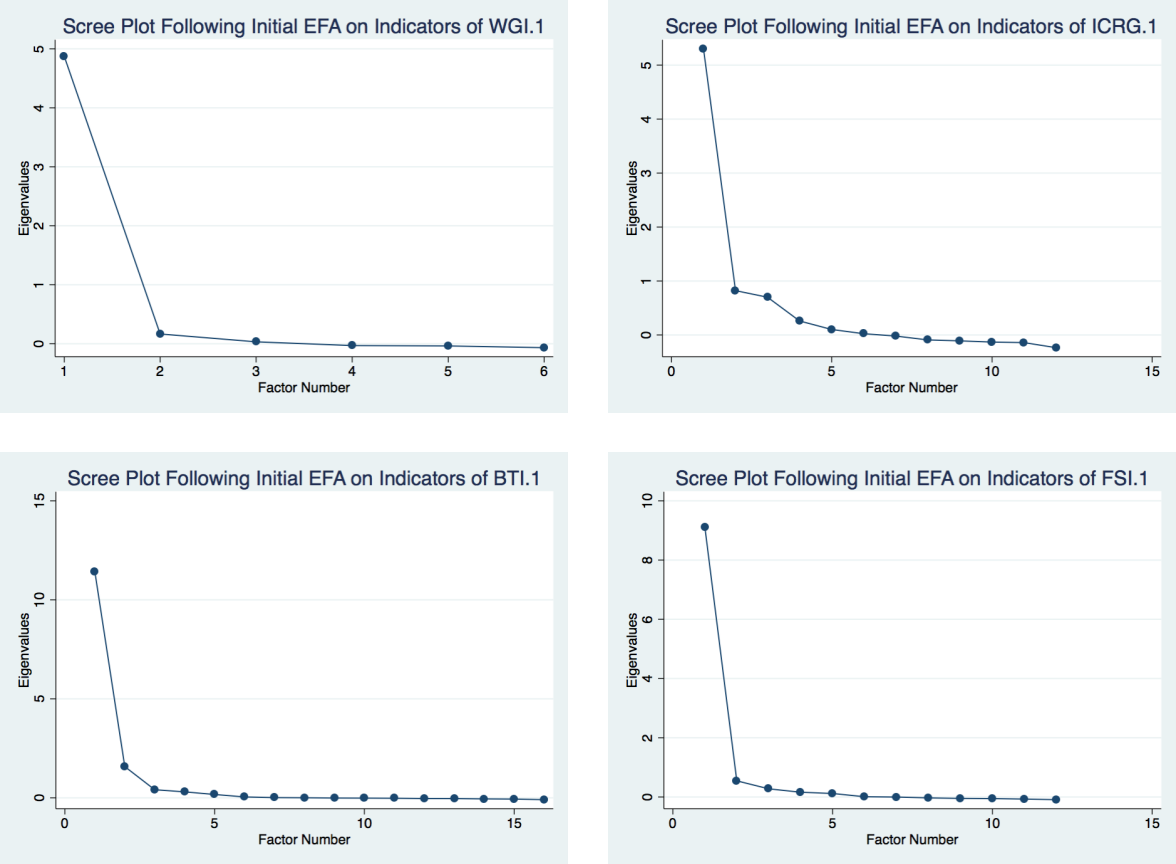


Figure B.2: The Hypothesized Model of Fundamental Factors of the WGI

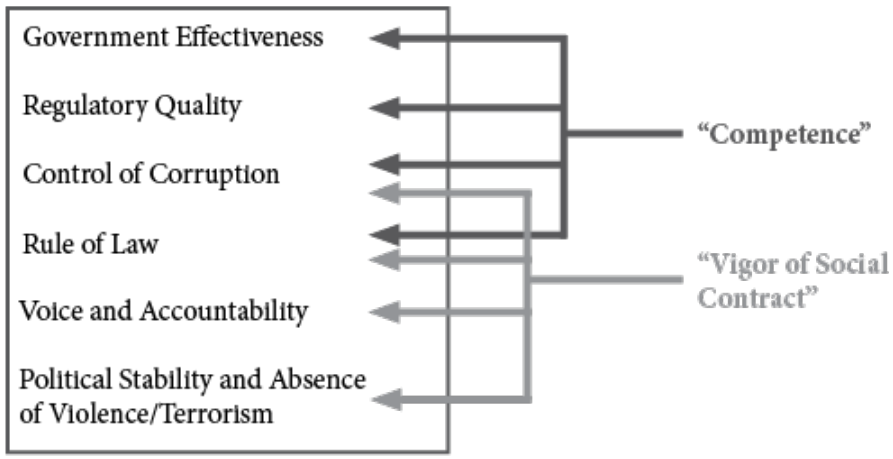


Figure B.3: The Hypothesized Model of Fundamental Factors of the ICRG

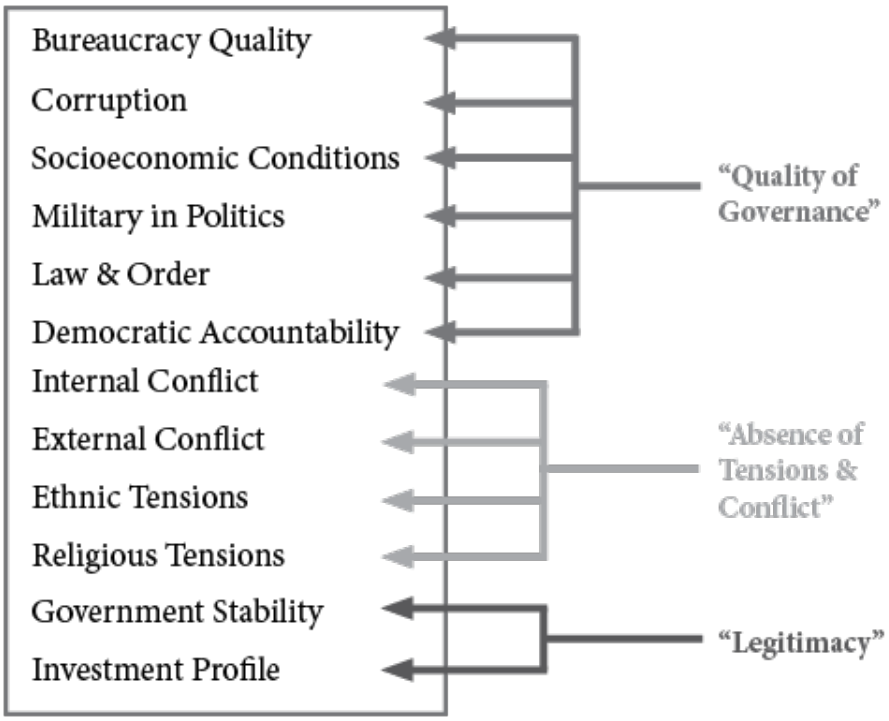


Figure B.4: The Hypothesized Model of Fundamental Factors of the BTI

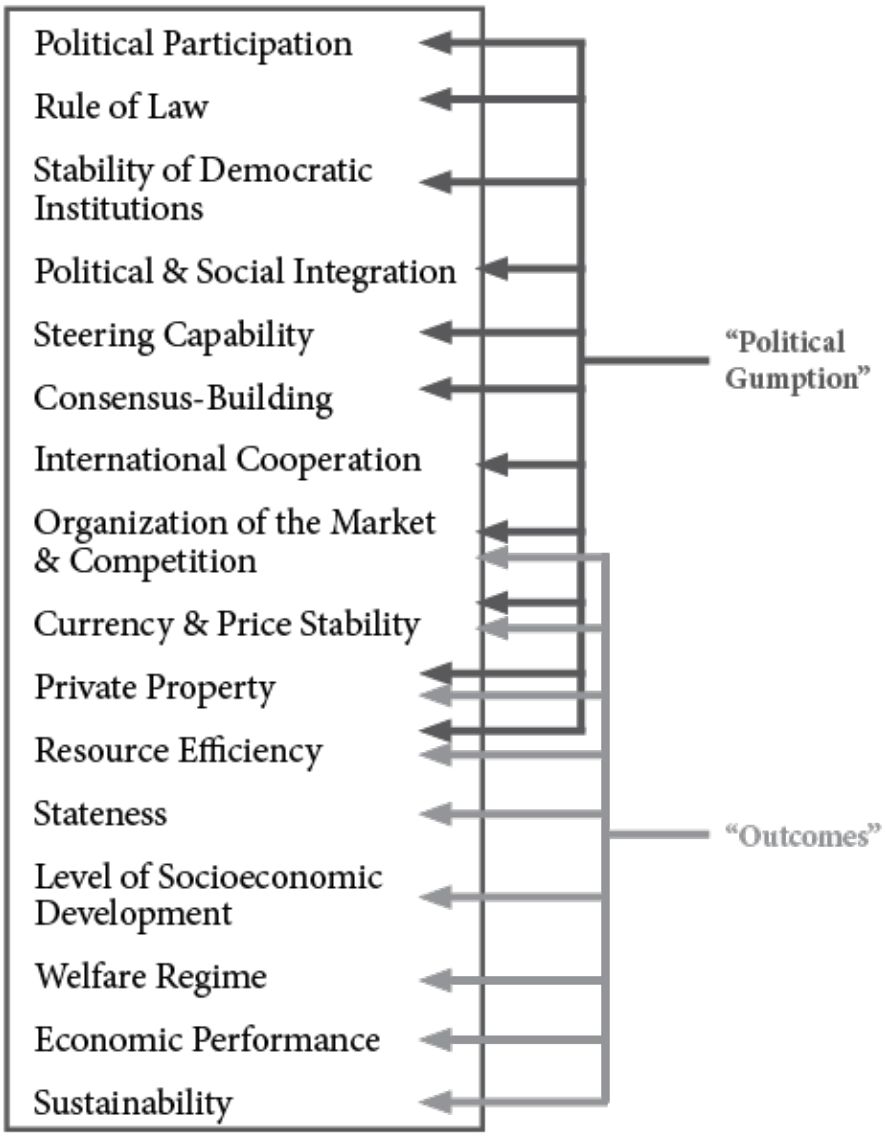


Figure B.5: The Hypothesized Model of Fundamental Factors of the FSI

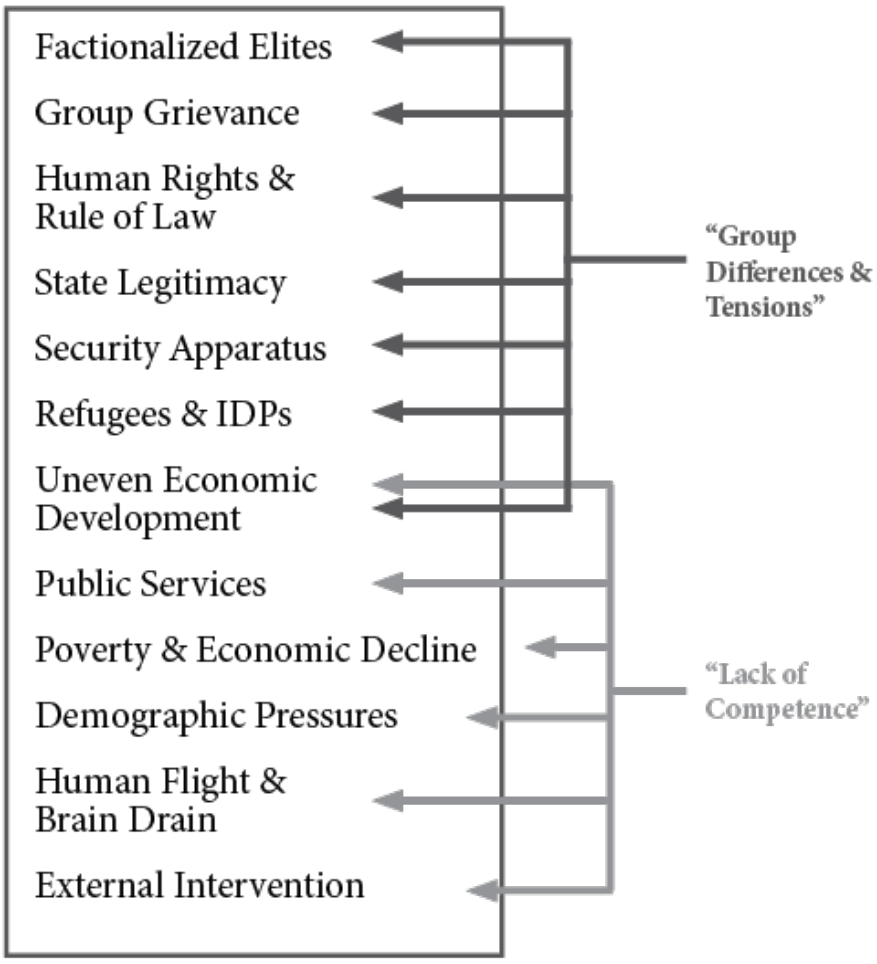


Figure B.6: The Scree Plot of Eigenvalues Extracted from Initial EFA on All Indicators

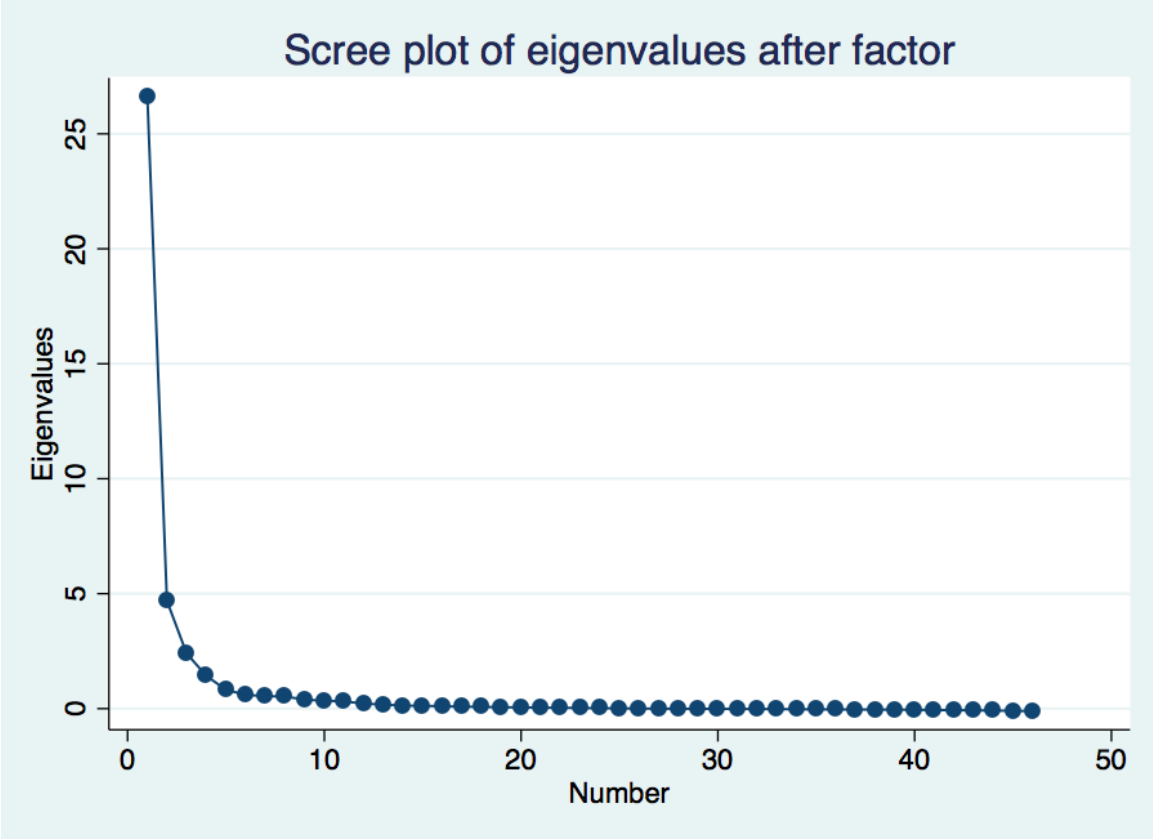


Figure B.7: The Manifestation in the WGI of the Fundamental Elements of State Capability

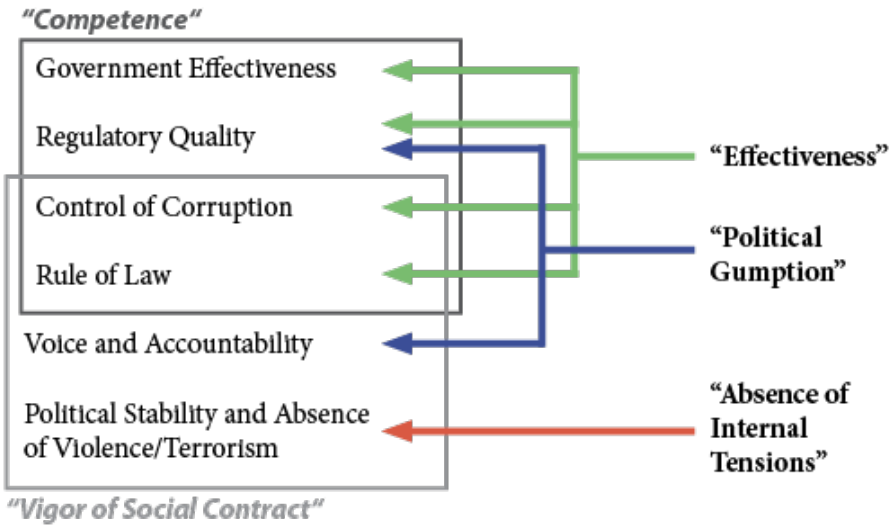


Figure B.8: The Manifestation in the ICRG of the Fundamental Elements of State Capability

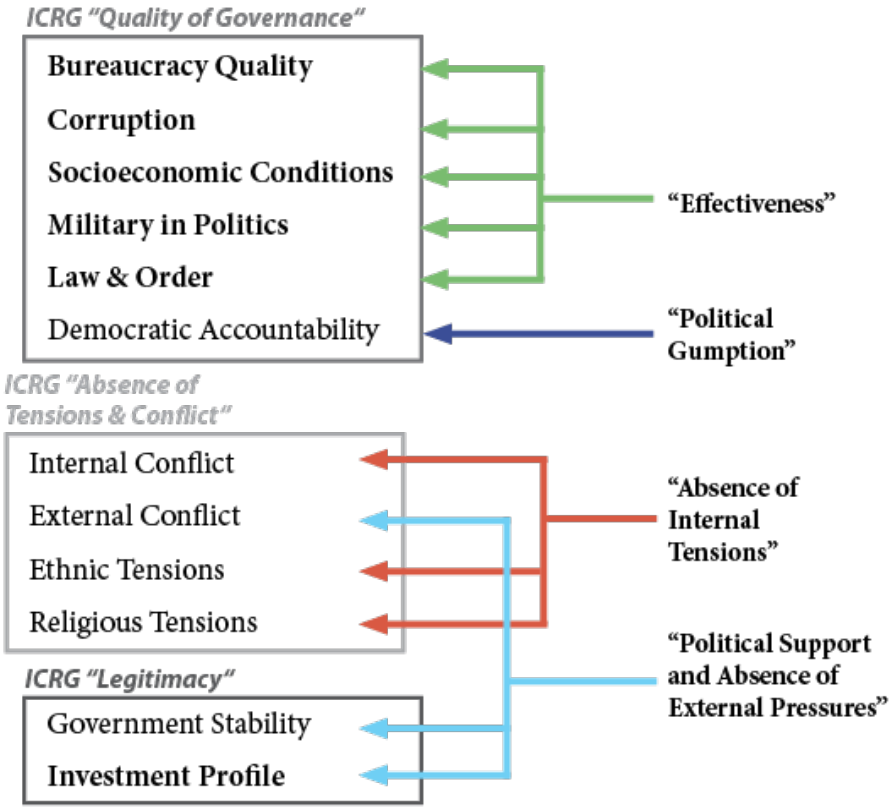


Figure B.9: The Manifestation in the BTI of the Fundamental Elements of State Capability

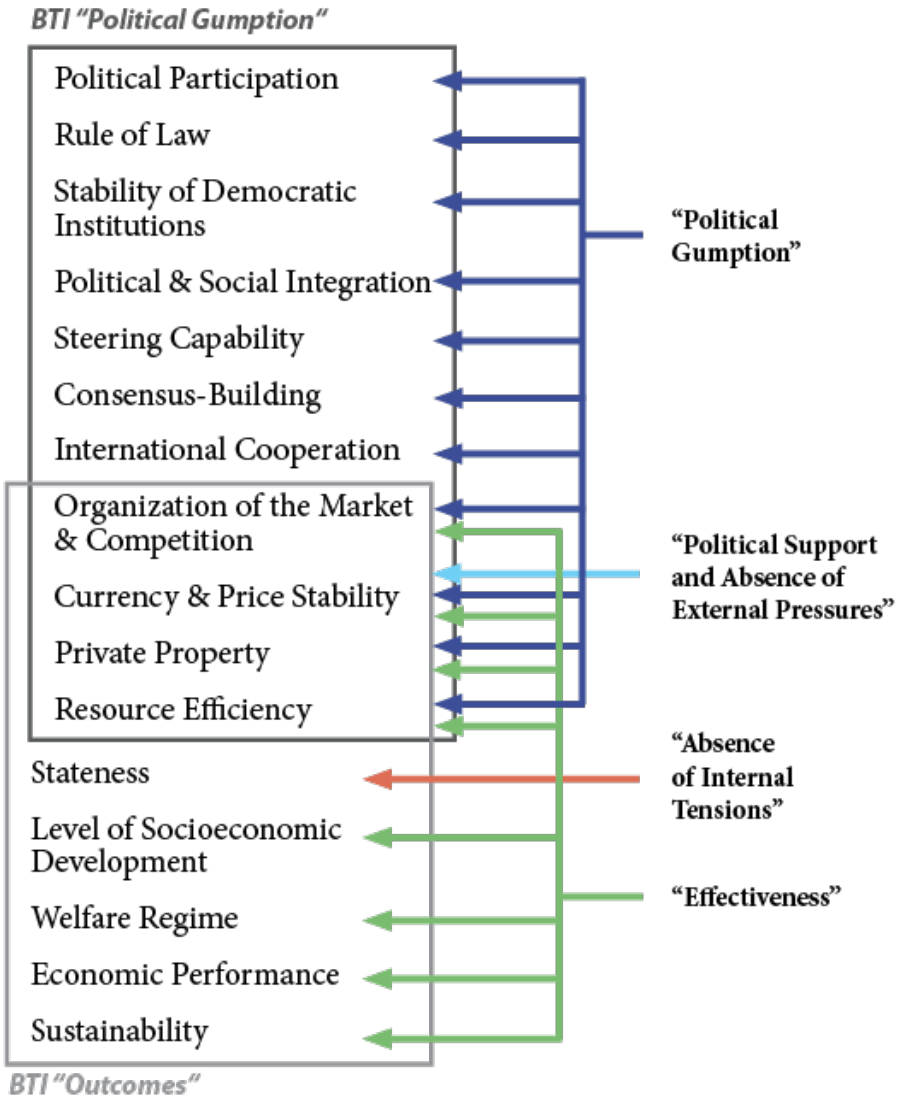


Figure B.10: The Manifestation in the FSI of the Fundamental Elements of State Capability

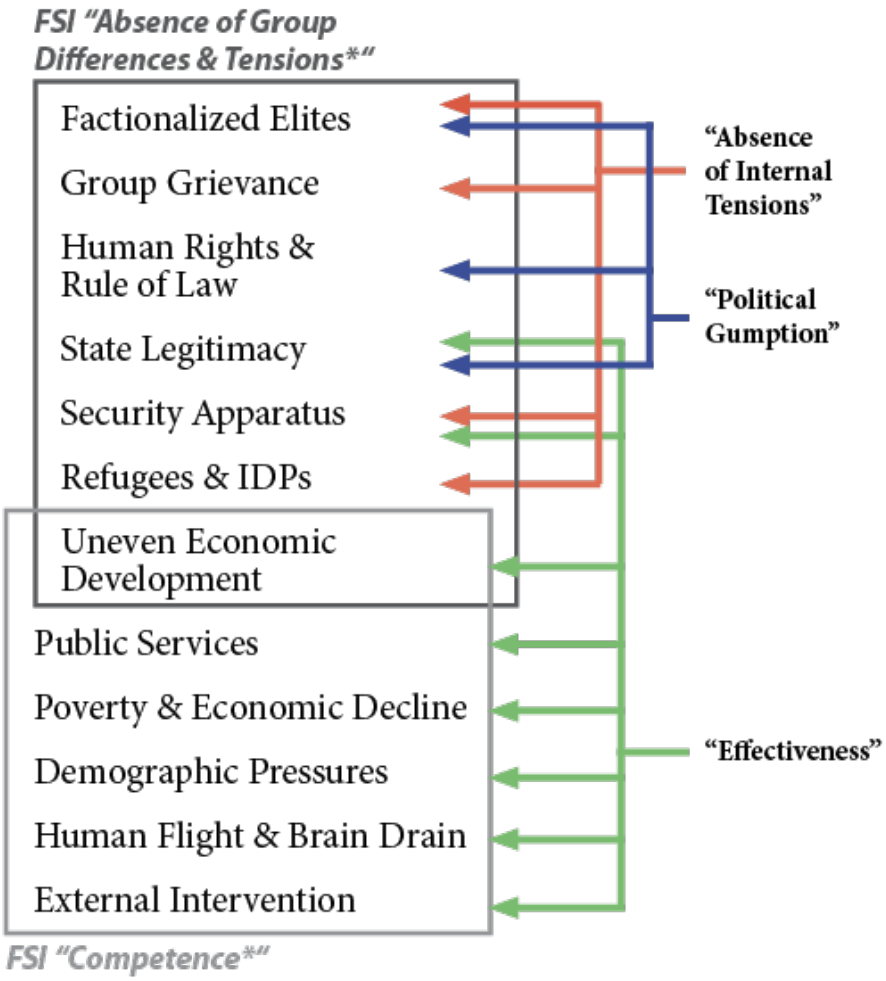


Figure B.11: The Manifestation of the First Fundamental Element in Each State Capability Index

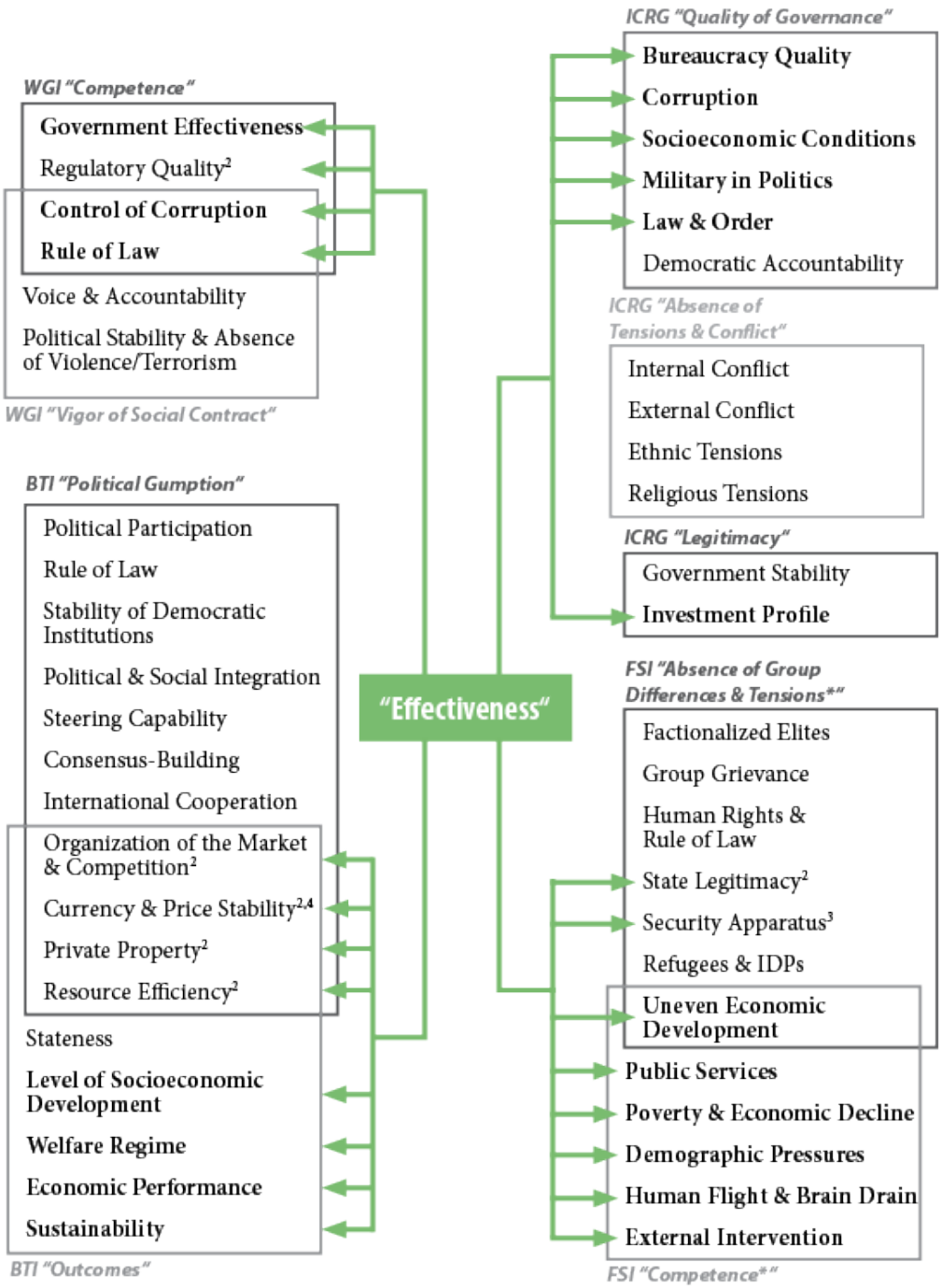


Figure B.12: The Manifestation of the Second Fundamental Element in Each State Capability Index

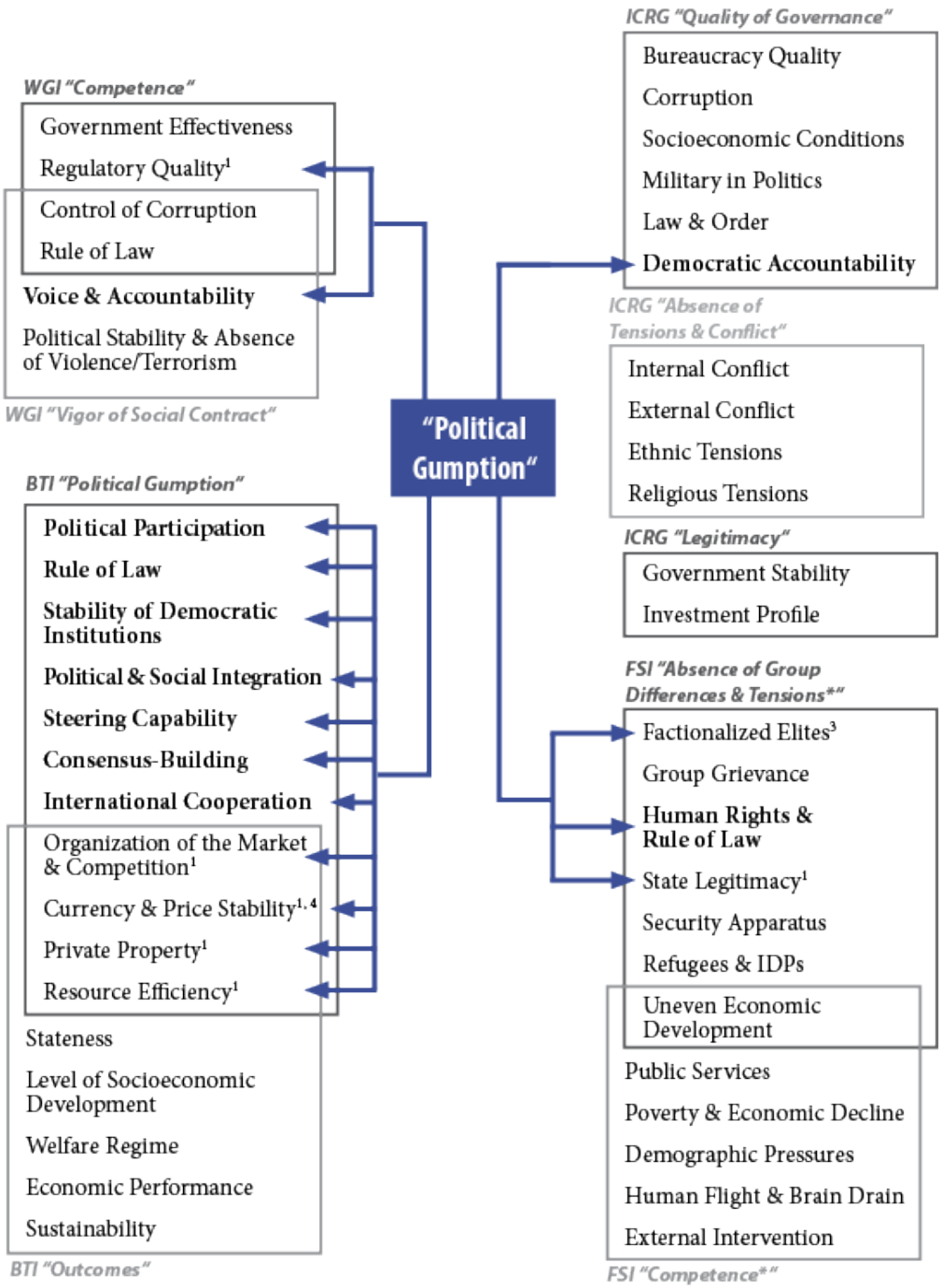


Figure B.13: The Manifestation of the Third Fundamental Element in Each State Capability Index

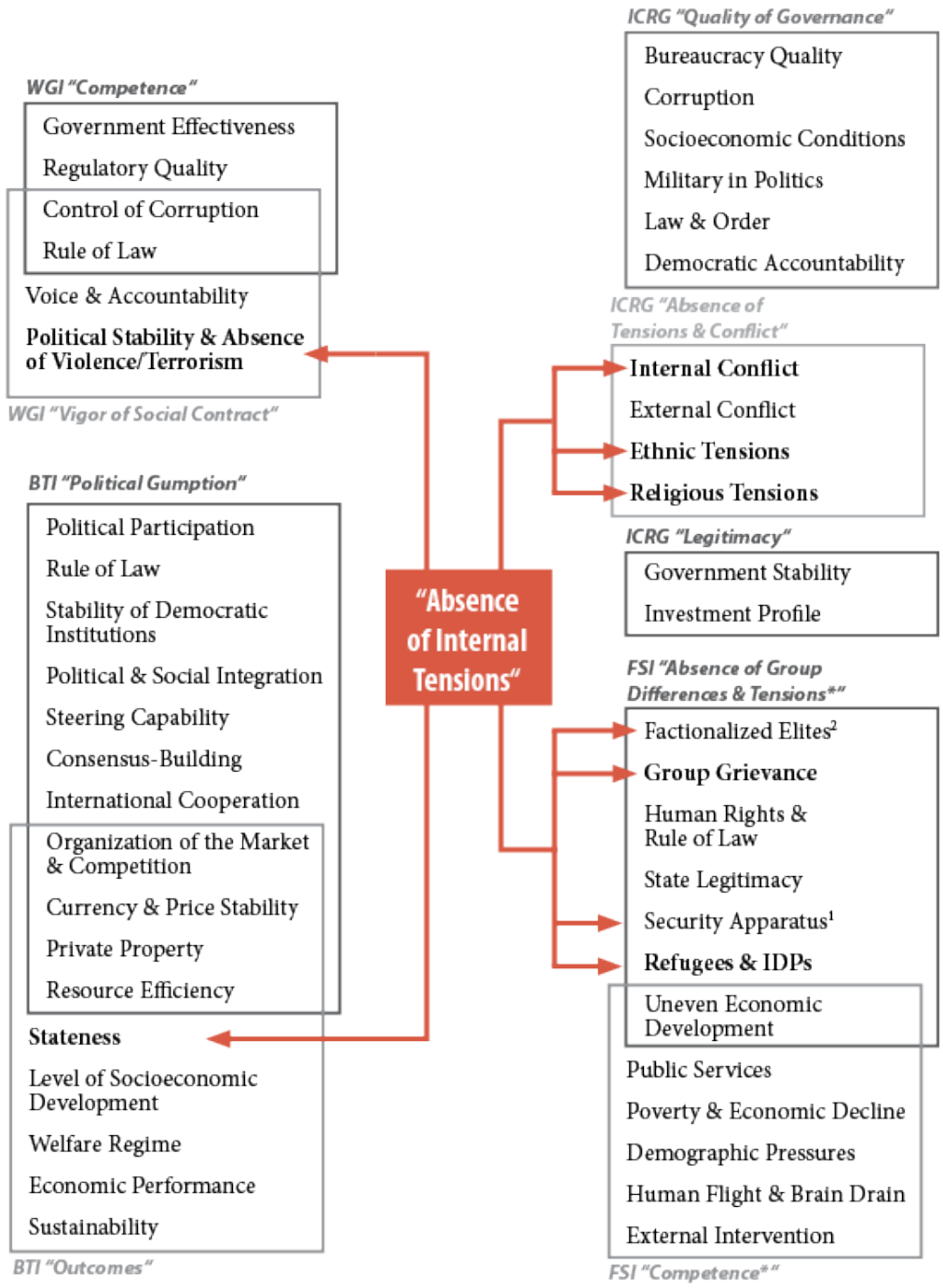
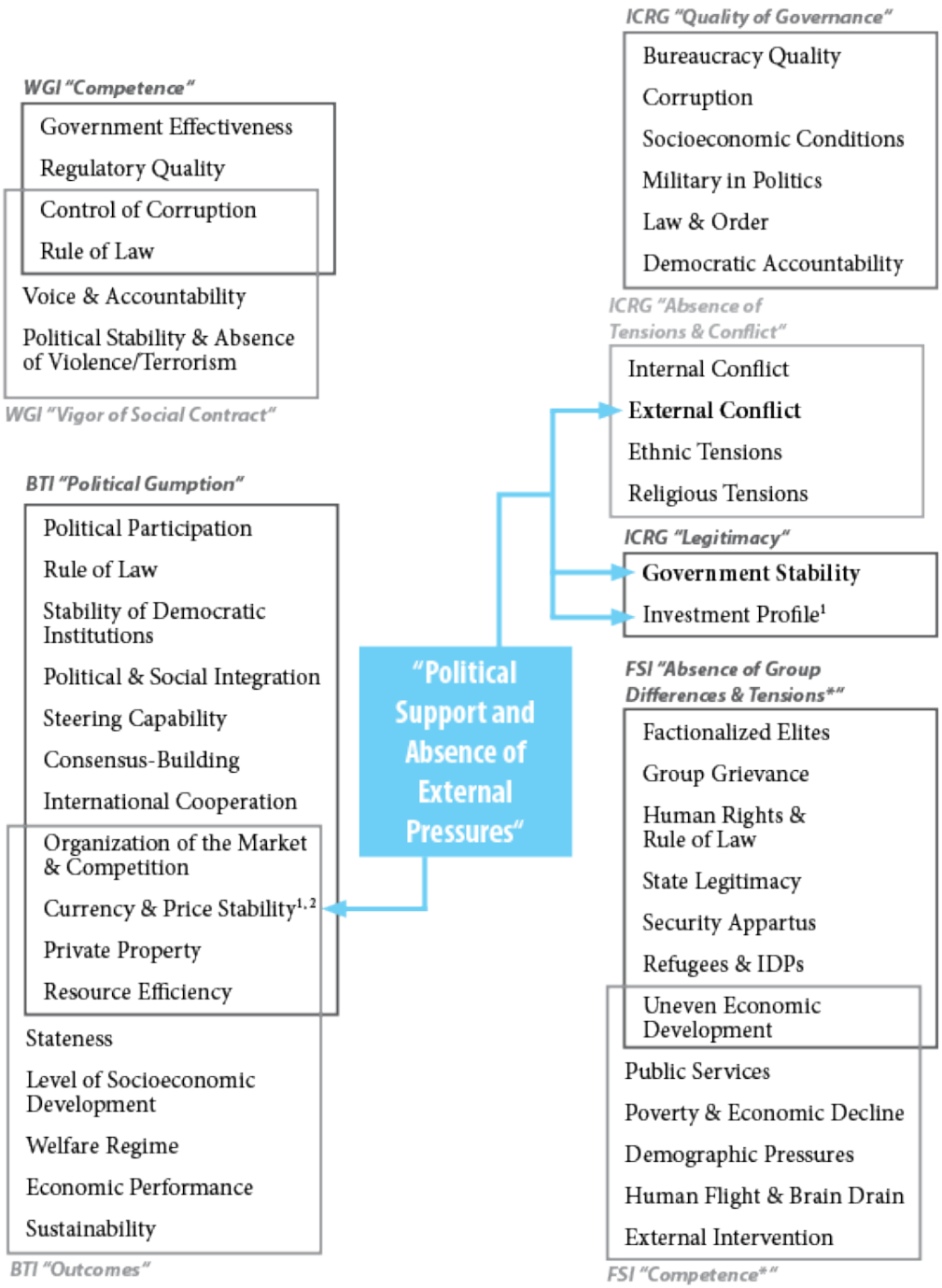


Figure B.14: The Manifestation of the Fourth Fundamental Element in Each State Capability Index



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